Technical Memorandum
PCB Investigation
at South Helix House Transfer Room

NCTAMS LANT DET Cutler
Cutler, Maine

September 2013

Prepared for:
Department of the Navy
Naval Facilities Engineering Command, Mid-Atlantic
Norfolk, Virginia

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Prepared under:
Naval Facilities Engineering Command
Contract Number N62473-11-D-2205
Delivery Order WE01

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REVIEW AND APPROVAL

Project Manager: ______________________________ Date: ____________

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ACRONYMS AND ABBREVIATIONS

µg/100 cm2	microgram per 100 centimeters squared
CFR	Code of Federal Regulations
cm	centimeter
CRZ	Contamination-Reduction Zone
CTO	Contract Task Order
EPA	U.S. Environmental Protection Agency
EZ	Exclusion Zone
HASP	Health and Safety Plan
HEPA	high-efficiency particulate air
HF	High Frequency
HSWA	Hazardous and Solid Waste Amendments Act
ID	identification
LANT DET	Atlantic Detachment
MEDEP	Maine Department of Environmental Protection
mg/kg	milligram per kilogram
NAVFAC MIDLANT	Naval Facilities Engineering Command Mid-Atlantic
Navy	Department of the Navy
NCTAMS	Naval Computer and Telecommunications Area Master Station
NFPA	National Fire Protection Association
PCBs	polychlorinated biphenyls
PPE	personal protective equipment
ppm	parts per million
RA	Remedial Action
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and Analysis Plan
TSCA	Toxic Substance Control Act
U.S.	United States
VLF	very low frequency
VOC	volatile organic compound

1.0 INTRODUCTION

TriEco, LLC - Tetra Tech, Inc. (TriEco-Tt) has been retained by the United States (U.S.) Department of the Navy (Navy), Naval Facilities Engineering Command Mid-Atlantic (NAVFAC MIDLANT), under Contract Number N62473-11D-2205, Contract Task Order WE01 (CTO WE01) to perform a polychlorinated biphenyl (PCB) investigation at Naval Computer and Telecommunications Area Master Station (NCTAMS) Atlantic Detachment (LANT DET) Cutler, South Helix House (SHH) Transfer Room. The objectives of this investigation were to: (1) determine the concentrations of PCBs on equipment cabinets and in the floor and wall materials of the SHH Transfer Room, where an historical spill of PCB-containing transformer oil reportedly occurred; and (2) attempt to decontaminate the walls, floor (and equipment, if necessary) of the SHH. Work included mobilization, site and staging area preparation, decontamination and exclusion zone preparation, pre-cleaning sampling, equipment cabinet/wall/floor cleaning, post-cleaning sampling, investigation-derived waste (IDW) and decontamination storage, site restoration, and demobilization. This investigation was conducted in accordance with the Work Plan for PCB Investigation at South Helix House Transfer Room (TriEco-Tt, Revised Final, August 2013).

This Tech Memo is organized into five sections, as follows:

- Section 2.0 presents a site description and history of the NCTAMS LANT DET Cutler, and the PCB spill that occurred at the SHH Transfer Room.
- Section 3.0 describes the field investigation activities that occurred at the SHH.
- Section 4.0 presents the laboratory program and analytical results.
- Section 5.0 describes the findings and recommendations of this investigation.

2.0 BACKGROUND

This section presents a description of the NCTAMS LANT DET Cutler, as well as a brief history of the PCB investigations and actions that have been conducted at the SHH Transfer Room.

2.1 SITE DESCRIPTION

The NCTAMS Cutler facility is located on a 2,800-acre peninsula on the coast of eastern Maine, as illustrated on Figure 1. Established in June of 1961, NCTAMS Cutler is an active communications facility that provides radio signal transmissions to U.S. ships and submarines operating primarily in the North Atlantic and Arctic Oceans, and the Mediterranean Sea. The Cutler facility was formerly comprised of three principal units: (1) the Administrative and Housing Area; (2) the High Frequency (HF) Area; and (3) the Very Low Frequency (VLF) Area. The Administrative and Housing Area was transferred to the Cutler Development Corporation in December 2003. The HF and VLF Areas continue to operate on Navy-owned land.

The VLF Area is the location of the Cutler VLF transmitter and supports two VLF antenna arrays consisting of a northern and a southern array. The panels in each antenna array are supported by 13 main towers: a center tower surrounded by six inner ring towers and six outer ring towers (Figure 1). Each center tower is adjacent to a helix house and several other support buildings. The South Helix House is located at the center of the southern VLF antenna array. The South Helix House support buildings include: the Hoist Transfer Room; the Transformer Vault Building; the Helix Room; and Buildings 204, 206, and an unnumbered support building located at the southwest perimeter of Tower S-0 (Figure 2).

The South Helix House, where the PCB Investigation was conducted, is located within the secured boundaries of the active Cutler facility. Access to the South Helix House is limited to Cutler base personnel and is restricted by base security; access can only be gained through a base security checkpoint located in the northern portion of the base along Ridge Road (the entrance to the Cutler facility is accessed via Ridge Road, located approximately 1.5 miles west of Route 191 in Cutler).

The frequency of access to the South Helix House Transfer Room meets the TSCA definition of a “low occupancy area” (less than 6.7 hours per week). The Transfer Room is accessed infrequently, primarily by maintenance workers. Access to the Transfer Room is controlled by the Cutler Telecommunications Manager and the room is locked and secured. No access may be gained without coordination with the Cutler Telecommunications Manager. There is currently no residential or recreational use of the site, and children are not permitted access. The plausible exposure scenarios for the South Helix House Transfer Room are maintenance worker, and construction worker.

2.2 HISTORY

Descriptions of the PCB oil spill, the South Helix House Transfer Room, a previous investigation, and temporary actions taken by the Navy are presented below.

2.2.1 Previous Sampling and Remedial Actions

During the mid-1980s, approximately 40 to 50 gallons of PCB- dielectric oil were reportedly spilled from a switch located within the Transfer Room section of the South Helix House. The oil is believed to have leaked onto the floor and then migrated outside the door of the Transfer Room, affecting surface soils located between the Transfer Room, the Transformer Vault Building, and Tower S-0 (EA, 2000). In 1993, an analysis of the oil from the switch detected the presence of PCBs (Aroclor 1260) at a concentration of 780,000 parts per million (ppm) (EA, 2000). Based upon the evaluation of soil sampling data collected from the site as part of the Environmental Restoration Program (ERP, see below), the oil migrated downward through the soils to varying depths throughout the release area.

Sampling of soils in the vicinity of the South Helix House was conducted under the ERP in 1996, 1998, 1999, and 2000, and removal actions were conducted for contaminated soil in 1999 and 2000.

2.2.2 Transfer Room Description

The Transfer Room (Room 40) is located within the South Helix House (Building 101), which feeds lighting for the Southern Antenna Array; a description of the Transfer Room is presented below. Much of the information that follows was obtained during a May 6, 2013 site visit by TriEco-Tt.

The Transfer Room, constructed in 1960, is 22 feet long, 20 feet wide and approximately 10 feet high. The construction of the interior of the room is cinder block walls with a concrete slab floor. According to Cutler base personnel, an approximate 4-inch-diameter hole was drilled into the concrete slab west of the entryway to allow standing water to drain from the floor. A channel in the concrete slab, which also functions to drain standing water away from electrical equipment, is also present to the west of the entryway. The hole and channel locations are shown on Figure 3. It is not known if these building features were in place prior to the PCB oil spill which occurred in the mid-1980s.

The electrical equipment currently existing in the Transfer Room is presented on Figure 3. The main power feed of 4,160 volts of electricity is fed from the power plant to the Transfer Room, which powers a number of components, including the aircraft warning lights atop the Southern Array antenna towers. Two dry transformers are located in the eastern and northern portions of the building. A number of conduits containing high-voltage electrical lines connecting equipment in the Transfer Room are located just under the floor slab. There is one access point to the building, a locked doorway located along the southern wall, as well as a single louver window in the northeast corner of the building.

2.2.3 Previous Transfer Room Surface Wipe Sampling Investigation

In September 2012, Michael Baker Jr., Inc. (Baker) conducted a PCB Hazardous Materials Survey at the SHH Transfer Room on behalf of the Navy. The survey was coordinated with MEDEP. As part of the PCB Hazardous Materials Survey, base personnel were interviewed regarding the spill. According to Baker, site personnel could not confirm that the spill occurred, however, they estimated that if the spill had occurred, the most probable location was an oil-filled switch located in the northeast corner of the Transfer Room. This switch was reportedly removed sometime in the mid- to late 1980s (Baker, 2013). A February 1960 drawing obtained from the NCTAMS Cutler Public Works Department (DON, 1960) does not show a switch in the northeast corner of the Transfer Room.

During the field inspection survey, Baker noted there were no visual indications of a previous spill within the room or on the walls. The floor and walls appeared to be generally clean with no large scale discolored or stained areas and no oily residues were observed. Some dark staining was observed around the supports of the main transfer switch located in the center of the room. There was also evidence of fluid migration through the concrete floor as concrete located under the temporary flooring and near equipment was damp at the time of the site visit. In addition, there was evidence of fluid migration on the floor and walls in the form of secondary efflorescence. Efflorescence is a white crystalline mineral salt left on masonry surfaces as fluid carrying salts and traces of minerals migrates through masonry and evaporates. (Baker, 2013)

During the PCB Hazardous Materials Survey a total of 19 primary environmental surface wipe samples were collected from the suspected spill area in a hexagonal grid pattern, following procedures outlined in the associated Sampling and Analysis Plan (SAP) (Baker, 2012). Three additional field-located, discretionary samples were collected, based on historic information and visual observations.

The associated previous surface wipe sample locations and PCB results are shown on Figure 3.

Sample HTR-WP20 was collected in the northeast corner of the room at the location where the switch equipment was reportedly located at the time of the release. This equipment has since been removed from the room. Samples HTR-WP21 and HTR-WP22 were located in stained areas of the floor.

PCB Aroclor-1260 was detected in all surface wipe samples collected within the Transfer Room. Concentrations of Aroclor-1260 ranged from 72 micrograms per 100 centimeters squared ($\mu g/100cm^2$) to 240,000 $\mu g/100cm^2$. All sample results exceed the EPA PCB Spill Cleanup Policy standard of 10 $\mu g/100\ cm^2$ for low-contact, indoor, non-impervious surfaces located in other restricted access areas, as defined in Title 40 CFR, Part 761, Subpart G – PCB Spill Cleanup Policy (40 CFR 761) (EPA, 1987b).

2.2.4 Temporary Actions

In October 2012, based on the results of the PCB Hazardous Materials Survey, the Navy took action to reduce the potential for worker exposure to PCBs in the South Helix House Transfer Room. This action consisted of: covering the floor with heavy plastic sheeting to prevent any potential worker exposure to the PCB-contaminated floor; placing plywood sheets over the plastic sheeting to prevent slip hazards; and placing controls on worker access to the South Helix

House Transfer Room. As the room contains equipment that is mission-essential, the room must be accessed occasionally (an estimated two to three times each month) to perform essential functions. Only a limited number of personnel are authorized to enter the room, and a lock is installed on the door to prevent unauthorized access. Work in the building is strictly managed to ensure that the building is accessed only when necessary to support mission-essential work until a corrective action is implemented.

3.0 INVESTIGATION ACTIVITIES

The following sections describe the activities conducted as part of the PCB Investigation.

3.1 DETAILED SCOPE

The PCB investigation included the following activities:

- Preparation and submission of site-specific plans including a Work Plan and Health and Safety Plan (HASP);
- Mobilization;
- Site preparation, including decontamination area and exclusion zone preparation, and removal of the temporary flooring for offsite disposal;
- Pre-cleaning sampling and analysis, including surface wipe, bulk concrete, and caulking samples;
- Manual decontamination consisting of a double wash utilizing Alconox® soap and water;
- Post-cleaning sampling and analysis, including surface wipe and bulk concrete samples;
- Site restoration, including wall and floor patches and repairs, and placement of a new temporary floor;
- IDW and decontamination waste characterization (Off-site disposal will be completed by October 2013.) ; and
- Demobilization of contractor personnel, equipment, materials, and temporary facilities.

3.2 MOBILIZATION / SITE PREPARATION

The field team arrived onsite at the SHH on August 5, 2013. Upon arrival, TriEco-Tt personnel met with the Navy contact to coordinate with the roofing contractor for ingress/egress to the SHH. Prior to commencing site preparation and sampling activities, the SHH Transfer Room was screened for electrical hazards by the TriEco-Tt National Fire Protection Association (NFPA) qualified electrical engineer. All electrical equipment, conduit, and wiring were inspected to assure that they were in safe working order, and that all openings were sealed. Doors to electrical enclosures were checked to ensure that the latching mechanism would hold the doors in the closed position. All electrical equipment within the room was checked using a Fluke volt-ohmmeter to ensure that it was properly grounded. As a further check, an infrared temperature test was conducted on the equipment. All tests and checks indicated that the Transfer Room was a safe environment in which to work, understanding that it contained high voltage electrical equipment, and proper care would be taken when working around that equipment.

Upon completion of the electrical safety check, TriEco-Tt's remediation subcontractor, ENPRO Services, Inc. (ENPRO), began construction of the exclusion zone area and decontamination area. Construction of the exclusion zone included placement of approximately 15 square feet of poly sheeting over the ground surface in an area immediately outside of the Transfer Room door. The area was marked using traffic cones and caution tape to exclude onlookers. Materials maintained within the exclusion zone included safety supplies such as an eyewash station and first aid kit, as well as a receptacle for disposal of personal protective equipment (PPE). The decontamination area was located adjacent to the Transfer Room entryway and consisted of wash and rinse tubs for equipment.

When construction of the exclusion zone and decontamination area was complete, ENPRO began removal of the Transfer Room temporary floor that had been placed by the Navy in the fall of 2012. The plywood sheets that comprised the flooring were removed and cut to fit in 1-cubic-yard (cy) containers; the poly sheeting that had been covering the plywood floor was removed and placed in the containers with the plywood. Following removal and containerization of all temporary flooring materials, the containers were placed into the site conex box, pending characterization and disposal.

3.3 PRE-CLEANING SAMPLING

The Revised Final SAP (Appendix A) called for the collection of equipment cabinet surface wipe samples, bulk concrete floor samples, bulk concrete wall samples, and bulk caulking samples from the floor-wall joint, prior to the implementation of cleaning activities. In addition to these samples, solids that were observed in a floor trench and in a hole in the floor immediately west of the Transfer Room entryway were also sampled. Field sample collection forms are presented in Appendix B.

Equipment cabinet surface wipe samples were collected in accordance with the *USEPA Polychlorinated Biphenyl Inspection Manual* (2004), at the sample locations depicted on Figure

4. These surface wipe samples were collected using a pre-cut, 10-square-centimeter template and a small gauze pad that was soaked in pesticide-grade hexane (provided by the laboratory). The wetted gauze was applied to the wipe template area using moderate hand pressure, and wiped in an up-and-down motion, moving from left to right, then in a side-to-side motion, moving from the top to the bottom of the sample area. The gauze was then placed in the appropriate sample jar and logged into the laboratory-provided chain-of custody (COC) documentation. Sample templates and gloves worn by the sampler were disposed of and replaced between each sample location. In total, ten pre-cleaning equipment cabinet surface wipe samples were collected.

Bulk samples consisting of concrete (from the walls and floor) and caulking (from the floor-wall joint) were collected in accordance with the *USEPA Region I Draft Standard Operating Procedure (SOP) for Sampling Porous Surfaces for Polychlorinated Biphenyls*, dated May 5, 2011. Locations of wall concrete samples are presented on Figure 5; locations of floor concrete samples and caulking samples are presented on Figure 6. Concrete samples were collected as composites. At each concrete sampling location, an electric-powered hammer drill equipped with a ½-inch or ¼-inch carbide drill bit was used to advance holes to a depth of 0.5 inches. The number of holes advanced for each sample location was determined by the volume of concrete dust produced. For wall concrete samples, an aluminum tray was placed beneath the area to collect the pulverized concrete during drilling. For each sample, at least 10 grams of pulverized concrete were placed into a 4-ounce jar, either directly from the aluminum tray (for wall samples) or using a disposable plastic scoop (for floor samples). Both the aluminum tray and scoop were disposed of after each sample; the drill bit was decontaminated according to the procedures outlined in Section 4.0 of the SAP (Appendix A).

Bulk caulking samples were collected either by using a decontaminated box cutter to cut caulking from the floor-wall joint, or in some areas, by pulling caulking from the wall by hand. Upon removal, the caulking was placed into the appropriate sample container and the container was labeled and logged onto the laboratory-provided COC form.

In total, the following pre-cleaning samples were collected: six bulk concrete floor samples; 12 bulk concrete wall samples; and four bulk caulking samples.

Solids samples were collected directly from the trench and floor hole using disposable plastic scoops, at the locations presented on Figure 6. Solids were placed directly into the appropriate sample containers which were then logged onto the laboratory-provided COC form. The solids were not homogenized prior to placing in the sample container, due to the small total volume available within the hole and trench. In total, two pre-cleaning solids samples were collected.

Once all samples had been collected, the holes that remained as a result of drilling the concrete were repaired using concrete patching material purchased from a local hardware store.

3.4 CLEANING / DECONTAMINATION

Transfer Room cleaning/decontamination activities were performed by ENPRO on August 6 and 7, 2013. The cleaning and decontamination task commenced immediately following completion of the pre-cleaning sampling. Two consecutive decontamination events were conducted to remove PCB contamination from the walls, floor, and equipment of the SHH Transfer Room.

The Work Plan specified that, for safety reasons, the electrical equipment present in the Transfer Room should be wrapped in plastic prior to cleaning in order to isolate it from cleaning activities (i.e., to ensure that wash water did not come in contact with equipment, potentially causing a hazardous condition). However, due to the low volume of water being used during cleaning, the TriEco-Tt NFPA-qualified electrical engineer determined this measure to be unnecessary; therefore, the equipment was not wrapped.

The Transfer Room wall surfaces below 8 feet in height and the floor were cleaned with a solution of water and soap (Alconox®). For the floor, brushes were used to scrub in the soap and water solution in order to remove as much residual PCB contamination as possible. The soapy water was applied and scrubbed directly into the floor at a rate of approximately 1 gallon for every 55 square feet. Following application and scrubbing, any soapy water solution that was not absorbed into the concrete was vacuumed up and containerized in a 55-gallon drum for disposal.

Transfer Room walls and equipment were cleaned using disposable rags soaked in the soapy water (excess water was removed so that the rags were damp but not dripping, prior to equipment cleaning). These cleaning processes were utilized to minimize any risk of electrocution to workers due to the presence of high voltage equipment. Upon completion of the initial round of cleaning of the walls, floor, and equipment, ENPRO repeated the process in a second cleaning round.

All cleaning fluids and rinse water generated during the cleaning /decontamination activities were captured and not allowed to migrate beyond the Transfer Room. All liquid and solid waste generated during decontamination activities, including PPE, was containerized in 55-gallon drums.

3.5 POST-CLEANING SAMPLING

The Revised Final SAP called for the collection of additional (post-cleaning) samples after the Transfer Room cleaning activities had taken place. These included wipe samples collected from the equipment cabinets and from the walls and floor, as well as bulk concrete wall samples and bulk concrete floor samples. All surface wipe samples and bulk concrete samples were collected following the same procedures described in Section 3.3. Equipment cabinet wipe sample locations are presented on Figure 4; wall sample locations are presented on Figure 5; and floor and caulking sample locations are presented on Figure 6.

In total, the following post-cleaning samples were collected: 10 equipment wipe samples; 6 floor wipe samples; 12 wall wipe samples; 6 bulk concrete floor samples; and 12 bulk concrete wall samples. Sample collection forms are presented in Appendix B.

3.6 DEMOBILIZATION

After completion of all post-cleaning sampling activities, a new temporary floor was placed in the Transfer Room. First, poly sheeting was cut to fit and then placed over the floor; then plywood sheets were cut to fit and placed over the poly sheeting, to reduce slip and trip hazards.

When placement of the new temporary floor was completed, ENPRO disassembled the exclusion zone and decontamination area. Waste materials from that activity were then included with the other decontamination waste.

4.0 LABORATORY PROGRAM

The following sections discuss the analytical program and the results of the SHH Transfer Room PCB Investigation.

4.1 LABORATORY ANALYSIS

The samples collected as part of the PCB Investigation were analyzed by Spectrum Analytical, Inc. (Spectrum) of North Kingstown, Rhode Island. Spectrum is a State-of-Maine-certified environmental laboratory, as required by Title 22 Maine Revised Statutes Annotated (MRSA) Chapter 157-A, an accredited U.S. Department of Defense (DOD) Environmental Laboratory Accreditation Program (ELAP) laboratory, and is recognized by the USEPA National Lead Accreditation Program (NLAP). The laboratory calibrated, maintained, tested and inspected instruments used for analysis in accordance with their laboratory Quality Assurance Manual (QAM) and quality assurance summary.

Samples were submitted to Spectrum for PCB analysis by EPA SW-846 Method 3540C/8082. PCBs included in the laboratory analysis were Aroclor-1016, 1221, 1232, 1242, 1248, 1254, and 1260.

4.2 QUALITY ASSURANCE / QUALITY CONTROL SAMPLING

Quality assurance/quality Control (QA/QC) samples were collected in addition to the primary samples to assess the precision and accuracy/bias of the data. QA/QC samples consisted of duplicates, field blanks, laboratory QC, and rinsate blank samples. QA/QC samples were collected at the following frequency:

- Duplicates – 1 for every 10 samples
- Field Blanks – 1 for every 20 samples
- Laboratory QC – 1 for every 20 samples
- Rinsate Blanks – 1 for every 20 samples

4.3 SAMPLE HANDLING AND DOCUMENTATION

Samples for laboratory analysis were placed into the appropriate laboratory supplied containers for storage and shipment. Once samples were collected they were kept on ice to keep temperatures at or below 6° C. Each sample was given a unique sample ID, and each sample container was identified using standard labels. COC procedures were adhered to throughout the PCB Investigation to ensure a documented, traceable link between results and the samples they represent.

4.4 ANALYTICAL RESULTS

The laboratory results from the PCB Investigation are presented below. The following sections are organized by sample area (equipment, wall, and floor/caulking). An interpretation of the findings is presented in Section 5.1. Of the seven Aroclors analyzed for, the only one detected in any sample was Aroclor-1260. Laboratory analytical reports are presented in Appendix C. The results described in these sub-sections all pertain to Aroclor-1260 results.

4.4.1 Equipment Sample Results

Figure 4 presents the pre-cleaning and post-cleaning sample results for samples collected from the equipment. Only wipe samples were collected from the equipment, and they were collected both pre-cleaning and post-cleaning at approximate collocated sample locations (i.e. pre-cleaning samples should match up with post-cleaning samples).

Pre-cleaning samples results ranged from a maximum of 2.2 $\mu g/100cm^2$ to a minimum of Non-Detect. Post-cleaning sample results ranged from a maximum of 5.4 $\mu g/100cm^2$ (the duplicate sample collected with WP23) to Non-Detect. There were no equipment cabinet surface wipe samples that exceeded the 10 $\mu g/100cm^2$ action limit.

Table 1 presents the Aroclor-1260 results of the equipment samples.

4.4.2 Wall Sample Results

Figure 5 presents the pre-cleaning and post-cleaning sample results for samples collected from the Transfer Room walls. During the pre-cleaning sampling, bulk concrete samples were collected; during the post-cleaning sampling, both bulk concrete samples (matching the same locations as the pre-cleaning samples) and surface wipe samples were collected.

Aroclor-1260 results in the pre-cleaning bulk concrete ranged from a maximum of 40 milligrams per kilogram (mg/kg) to a minimum of Non-Detect. Aroclor-1260 results in the post-cleaning bulk concrete samples ranged from 120 mg/kg to a minimum of Non-Detect. In total, five of the 12 pre-cleaning samples exceeded the concrete sample action limit of 25 mg/kg, while four of the 12 post-cleaning results exceeded (only one location where both pre-cleaning and post-cleaning results exceeded).

Only post-cleaning wall surface wipe samples were collected and their Aroclor-1260 concentrations ranged from a maximum of 79 µg/100cm^2 to a minimum of 10 µg/100cm^2. All post-cleaning wall wipe samples exceeded the action limit of 10 µg/100cm^2.

Table 2 presents the Aroclor-1260 results for wall samples.

4.4.3 Floor Sample Results

Figure 6 presents the pre-cleaning and post-cleaning sample results for samples collected from the Transfer Room floor including bulk caulking samples. During the pre-cleaning sampling, bulk concrete, bulk caulking, and solids samples were collected; during the post-cleaning sampling, bulk concrete (matching the same locations at the pre-cleaning samples) and wipe samples were collected.

Aroclor-1260 results in the pre-cleaning bulk concrete samples ranged from a maximum of 16,000 mg/kg to a minimum of 370 mg/kg. Aroclor-1260 results in the post-cleaning bulk floor concrete samples ranged from a maximum of 11,000 mg/kg to a minimum of 2,500 mg/kg. All bulk floor concrete samples exceeded the sample action limit of 25 mg/kg.

Aroclor-1260 results in the post-cleaning floor surface wipe samples ranged from a maximum of 11,000 µg/100cm^2 to a minimum of 1,800 µg/100cm^2. All floor surface wipe results exceeded the action limit of 10 µg/100cm^2.

Aroclor-1260 results in the pre-cleaning caulking samples ranged from a maximum of 3,500 mg/kg to a minimum of 320 mg/kg. Results for all four samples exceeded the 25 mg/kg screening level.

Aroclor-1260 results in the pre-cleaning solids samples (of which there were only two) were 8,700 mg/kg in SD01 (collected from the trench) and 41,000 mg/kg in SD02 (collected from the floor hole). Both samples exceeded the 25 mg/kg screening level.

Table 3 presents the Aroclor-1260 results for floor samples.

5.0 FINDINGS AND RECOMMENDATIONS

The findings and recommendations of the PCB investigation are discussed below. The findings attempt to interpret the results and identify any patterns that may be present (spatially). Recommendations for additional activities to be performed at the SHH Transfer Room are based on evaluation of operating constraints for potential additional remedial actions to reduce exposure to the PCB-contaminated concrete in the floor and walls within the Transfer Room.

5.1 FINDINGS

In general, there is little known about the PCB spill that occurred at the SHH Transfer Room in the 1980s. There are no personnel currently employed at the base who can provide detailed information regarding the location of the spill or what types of clean-up actions (if any) were implemented.

The investigation results indicate that the spill has had the greatest effect on the floor of the Transfer Room (versus the walls or equipment). The greatest Aroclor-1260 concentrations were observed in both floor surface wipe and floor bulk concrete samples. With the limited number of samples collected, there does not appear to be any type of indication as to where the spill may have occurred within the space. Very high concentrations were observed in the surface concrete at both the back and front side of the switching unit, and samples varied greatly even when samples were collected next to one another. It is possible that after the spill, the PCB-containing oil was distributed across the floor unevenly, or that the concrete floor absorbed the oil at varying rates, due to unquantified characteristics of the concrete itself. Only limited data are available regarding the depth to which the PCB contamination penetrates the concrete floor; concrete samples collected as part of the PCB Investigation were advanced to a depth of only 0.5 inches to ensure worker safety as multiple high-voltage electrical cables are located under the Transfer Room floor.

Although all wall surface wipe samples and some wall bulk concrete samples exceeded screening criteria, the wall sample results were generally much lower than floor wipe and floor bulk concrete sample results. It is possible that the spill may have splashed onto the wall, thereby contaminating walls with PCBs. .

Lastly, the concentrations of Aroclor-1260 in collocated samples did not consistently decrease between pre- and post-cleaning samples; in many instances, the concentrations were significantly higher in the post-cleaning samples as compared to the pre-cleaning samples. This could be a function of decontamination methods used (decontamination could have been ineffective due to water volume restrictions and cleaning product restrictions), or possibly an inconsistency of concentrations across the sample area due to some unquantified characteristic(s). In addition, the cleaning activities may have mobilized the PCB-contaminated oil that had penetrated the concrete matrix.

5.2 RECOMMENDATIONS

This section presents recommendations for additional activities to be performed at the SHH Transfer Room. The activities presented here are designed to reduce exposure to the PCB-contaminated concrete in the floor and walls within the Transfer Room.

5.2.1 Regulatory Framework

The TSCA PCB regulations do not identify self-implementing procedures for decontaminating porous media, with the exception of a few cases. For concrete that is impacted by a PCB-containing oil spill less than 72 hours old, 40 CFR 761.79 allows the impacted concrete to be cleaned using a solvent washing process. For PCB-containing concrete that has been impacted by older spills, 40 CFR 761.30(p) allows the concrete to be treated by solvent washing, and permits continued use of the surface if it remains in service for use as originally intended.

5.2.2 Constraints on Potential Additional Remedial Actions

The main power feed of 4,160 volts of electricity at the South Helix House is fed from the power plant to the Transfer Room, which powers a number of components. Two dry transformers are located in the eastern and northern portions of the room. There is one access point to the building, a locked doorway located along the southern wall, as well as a single louver window in the northeast corner of the building.

The equipment located in the South Helix House Transfer Room is mission-critical, providing power to the South Helix House for Navy communications with vessels in the Atlantic Ocean. In addition, this equipment supplies power to the aircraft warning lights atop the Southern Array antenna towers and to the South Helix House fire protection system. This facility is active full time, and electrical power to the Hoist Transfer Room cannot be isolated.

Due to the mission-critical operation requirements for the South Helix House Transfer Room, the potential decontamination processes available for additional remediation are limited. Decontamination processes involving physical removal of the PCB-contaminated material would require temporary shutdown of electrical equipment to protect workers, which cannot be done without compromising the facility's mission. The presence of multiple, active, high-voltage electrical cables under the concrete floor also presents a significant health hazard to workers for any physical removal actions. Other decontamination processes using flammable solvent cleaning agents are not possible due to the risk of a fire or explosion from working with such materials in an active high-voltage electrical equipment room. These fire and explosion concerns also limit the use of flammable materials that may be used as encapsulation agents, such as epoxy.

5.2.3 Evaluation of Potential Additional Remedial Actions

Removal of PCBs present at high levels in the bulk matrix of porous materials such as concrete is difficult. Where concrete has not been coated with a sealant as a barrier against PCBs, significant penetration can occur, such that only scarification or removal of contaminated material may reduce the residues to acceptable levels. However, physical processes are not feasible at the Transfer Room due to the operational constraints at the facility, as discussed above.

Based on additional research, four technologies or processes were developed for evaluation for possible implementation, either as a stand-alone process or in combination with other processes:

1. CAPSUR® cleaning process
2. Additional Alconox and water cleaning process
3. Encapsulation with durable non-VOC (non-volatile-organic-compound) latex surface sealant
4. Scarification

Although some of the technologies would appear unfeasible due to operational constraints, the evaluation was carried through for comparison purposes. Results of the evaluation are presented below.

1) CAPSUR® cleaning process – The process consists of the application of a CAPSUR® (PCB decontaminant) and water mixture to the impacted concrete floor and walls, followed by scrubbing and rinsing of the floor and walls, with multiple wash/rinse cycles required. Integrated Chemistries, Inc., the product representative, noted that PCBs have shown a propensity to migrate into porous surfaces. If the concentrations of PCBs are very high, the spill is old, or at a site with a history of spills, multiple applications of CAPSUR will be necessary to get acceptable results.

   During/after the first few treatments, it is not uncommon for the post-cleaning PCB concentrations to be higher than the pre-cleaning concentrations due to the product's ability to extract PCBs from solid surfaces. Taking core samples for determination of depth of penetration is strongly recommended in these cases. CAPSUR® is a solvent-based cleaning agent.

   Pros:

   a) CAPSUR® product is relatively inexpensive;
   b) This process is a permanent remedy.

   Cons:

   a) CAPSUR® mixture must be applied, reacted material (film/residue) removed, and waste stream disposed of as hazardous material;
   b) Interim confirmatory sampling may be required;
   c) Due to the age of the spill and the concentrations, core samples should be collected to determine the depth of penetration;
   d) Effectiveness is uncertain, as the penetration of PCB contamination may be significant;
   e) Solvent-based cleaning agents cannot be used, as they pose an explosion risk due to the high voltage electrical power to the Transfer Room, which cannot be isolated without compromising the facilities mission.

2) Additional Alconox and water cleaning process - Additional Alconox/low-water-volume cleaning cycles, as used during the initial decontamination process, may be employed to attempt to lower PCB concentrations below required levels. The Alconox/low-water-volume cleaning method was initially selected because of restrictions placed on the cleaning operation due to the presence of high-voltage electrical equipment.

   Pros:

   a) Relatively inexpensive;
   b) Multiple decontamination cycles achievable in short duration;
   c) Permanent remedy.

   Cons:

   a) Minimal water used, non-solvent cleaning agent, and manual cleaning method required due to electrical hazards was not effective with multiple cleaning cycles previously;
   b) It is suspected that the cleaning method dislodged PCB-contaminated residue, however the use of minimal amounts of rinse water was not effective in removing the dislodged PCB-contaminated residue from the cleaned surfaces;
   c) Interim confirmatory sampling may be required.

3) Encapsulation with durable non-VOC latex surface sealant – This process consists of applying a durable non-VOC latex surface sealant material to the concrete floor and walls. This coating would seal PCB residuals on and in the concrete, and would prevent exposure of workers to the contaminated concrete surface. A two-coating system, with coats of contrasting colors, is applied after preparatory cleaning. The future use and occupation of the South Helix House Transfer Room would be contingent upon provisions for awareness and maintenance of the protective coatings. Signs would be placed to warn workers of the residual PCB contamination and the need to avoid damage to the coatings.

   Pros:

   a) Relatively simple application process;
   b) Durable material that will sustain mechanical abuse;

c) Low maintenance cost for this application.

d) Relatively low materials cost.

Cons:

a) Not a permanent remedy.

4) Scarification – This process uses specialized machines with carbide tipped blades to mechanically remove the contaminated concrete surface material of floors and walls to a depth of 1/4 - to 3/8-inch. Debris and dust generated by the process is collected for proper disposal.

Pros:

a) Permanent remedy;

Cons:

a) Relatively high cost;

b) Contaminated dust generated by the process must be controlled;

c) Significant field work duration and overall site activity;

d) Effectiveness is uncertain as PCB contamination penetration may be significant.

5.2.4 Conclusions/Proposed Remedial Action

Four potential additional remedial actions were evaluated for the PCB-contaminated material in the South Helix House Transfer Room as summarized below.

1. Option No. 1 (CAPSUR® cleaning process) would potentially be a permanent remedy, although its effectiveness is uncertain. However, it is not deemed feasible due to the fact that it would require isolating electrical power to the Transfer Room to eliminate the associated explosion hazard, thus interrupting critical mission activities of the facility.
2. Option No. 2 (Additional Alconox and water cleaning process) would not be effective; it was not successful in removal of PCB residue during multiple previous cleaning cycles.
3. Option No. 3 (Encapsulation with durable non-VOC latex surface sealant) would be an effective interim remedy based on the infrequent use of the Transfer Room. It presents a low hazard associated with the application in a active high-voltage electrical equipment area.

4. Option No.4 (Scarification) would not be feasible because it presents a significant health hazard due to the high-voltage electrical hazards to workers and could interrupt critical mission activities at the facility.

The Navy proposes Option No. 3 (Encapsulation with durable non-VOC latex surface sealant) as an interim remedial action to mitigate potential worker exposure to South Helix House Transfer Room PCB-contaminated materials, based on effectiveness, the low hazard associated with the application in a live high-voltage electrical equipment area, and the infrequent use of the Transfer Room. This interim remedial measure would be maintained by the Navy until such time when a permanent remedy that does not compromise the facility's mission can be safely implemented. Therefore, the Navy is working with TriEco-Tt to arrange for the encapsulation effort to be completed in October 2013.

6.0 REFERENCES

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TABLES

TABLE 1: Equipment Surface Wipe Sample Aroclor-1260 Non-Validated Results (µg/100cm^2)
Technical Memorandum, PCB Investigation at South Helix House Transfer Room, NCTAMSLANT DET Cutler, Cutler, Maine

Pre-Cleaning Surface Wipe Samples		Post-Cleaning Surface Wipe Samples	
SHHTR-WP-01	2.2	SHHTR-WP-17	3
SHHTR-WP-02	1.2	SHHTR-WP-18	2.7
SHHTR-WP-03	ND	SHHTR-WP-19	1.3
SHHTR-WP-04 / DUP01	ND / ND	SHHTR-WP-20	ND
SHHTR-WP-05	ND	SHHTR-WP-21	1.1
SHHTR-WP-06	1.5	SHHTR-WP-22	ND
SHHTR-WP-07	ND	SHHTR-WP-23 / DUP03	5 / 5.4
SHHTR-WP-08	ND	SHHTR-WP-24	ND
SHHTR-WP-09	1.3	SHHTR-WP-25	2.1
SHHTR-WP-10	ND	SHHTR-WP-26	2.1

Notes:
1 Surface wipe sample area: 10 centimeters (cm) by 10 cm.
µg/100 cm^2 micrograms per 100 square centimeters
ND not detected

TABLE 2: Wall Surface Wipe and Bulk Sample Aroclor-1260 Non-Validated Results

Technical Memorandum, PCB Investigation at South Helix House Transfer Room,
NCTAMSLANT DET Cutler, Cutler, Maine

Wall Surface Wipe Samples (µg/100cm^2)[1]	
Post-Cleaning[2]	
Post-Cleaning	**Post-Cleaning**
SHHTR-WP-27	26
SHHTR-WP-28	12
SHHTR-WP-29	41
SHHTR-WP-30	42
SHHTR-WP-31	18
SHHTR-WP-32	51
SHHTR-WP-33	10
SHHTR-WP-34	36
SHHTR-WP-35 / DUP04	8.3 / 18
SHHTR-WP-36	79
SHHTR-WP-37	15

Wall Bulk Concrete Samples (mg/kg)[3]			
Pre-Cleaning		**Post-Cleaning**	
SHHTR-CO-07	18	SHHTR-CO-25	120
SHHTR-CO-08	13	SHHTR-CO-26	9
SHHTR-CO-09	13	SHHTR-CO-27	12
SHHTR-CO-10	2	SHHTR-CO-28	13
SHHTR-CO-11	16	SHHTR-CO-29	44
SHHTR-CO-12	34	SHHTR-CO-30	55
SHHTR-CO-13	40	SHHTR-CO-31 / DUP04	15 / 20
SHHTR-CO-14	39	SHHTR-CO-32	20
SHHTR-CO-15	14	SHHTR-CO-33	44
SHHTR-CO-16	ND	SHHTR-CO-34	ND
SHHTR-CO-17	37	SHHTR-CO-35	19
SHHTR-CO-18	39	SHHTR-CO-36	13

Notes:
1 Surface wipe sample area: 10 centimeters (cm) by 10 cm.
2 No pre-cleaning wall surface wipe samples were collected.
3 Concrete samples represent concentrations detected in the top 0.5 inches.
mg/kg milligram per kilogram
µg/100 cm^2 micrograms per 100 square centimeters

TABLE 3: Floor Surface Wipe and Bulk Sample Aroclor-1260 Non-Validated Results

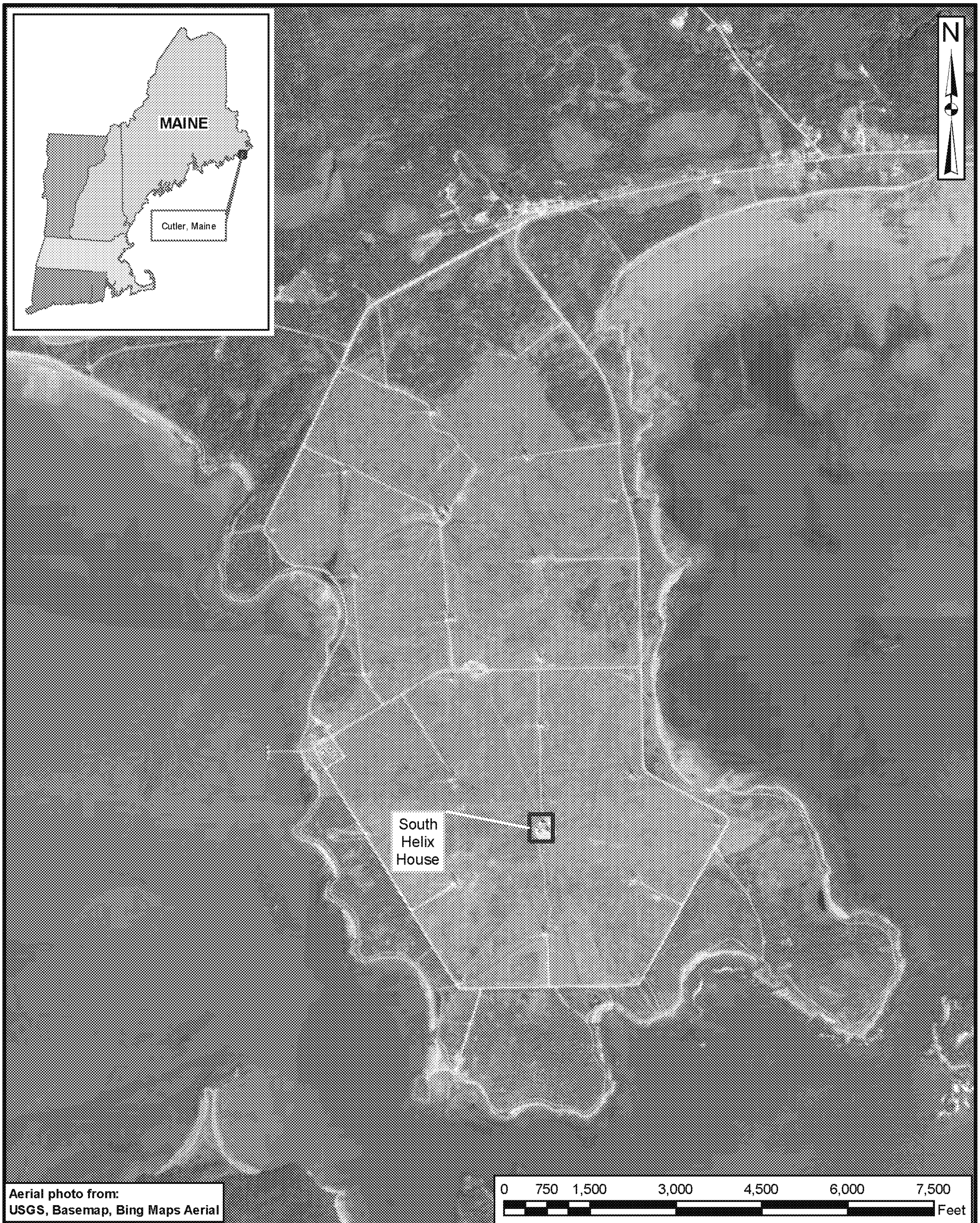
Technical Memorandum, PCB Investigation at South Helix House Transfer Room,
NCTAMSLANT DET Cutler, Cutler, Maine

Floor Surface Wipe Samples (µg/100cm^2) [1]			
Post-Cleaning[2]			
SHHTR-WP-11	7700		
SHHTR-WP-12 / DUP02	6600 / 6400		
SHHTR-WP-13	1800		
SHHTR-WP-14	11000		
SHHTR-WP-15	2000		
SHHTR-WP-16	2900		
Floor Concrete Samples (mg/kg)[3]			
Pre-Cleaning		**Post-Cleaning**	
SHHTR-CO-01	440	SHHTR-CO-19 / DUP02	3,600 / 2,400
SHHTR-CO-02	16,000	SHHTR-CO-20	11,000
SHHTR-CO-03 / DUP01	1,400 / 670	SHHTR-CO-21	3,100
SHHTR-CO-04	4,100	SHHTR-CO-22	8,700
SHHTR-CO-05	2,100	SHHTR-CO-23	2,500
SHHTR-CO-06	370	SHHTR-CO-24 / DUP03	6,700 / 3,800
Caulking Samples (mg/kg)			
Pre-Cleaning[4]			
SHHTR-CA-01	320		
SHHTR-CA-02	320		
SHHTR-CA-03	3,500		
SHHTR-CA-04	3,500		
Solids Samples (mg/kg)			
Pre-Cleaning[4]			
SHHTR-SD-01	8,700		
SHHTR-SD-02	41,000		

Notes:
1 Surface wipe sample area: 10 centimeters (cm) by 10 cm.
2 No pre-cleaning floor surface wipe samples were collected.
3 Concrete samples represent concentrations detected in the top 0.5 inches.
4 No post-cleaning caulking or solids samples were collected.
mg/kg milligram per kilogram
µg/100 cm^2 micrograms per 100 square centimeters

FIGURES

I:\02585\SI.RP.S7\CUT_SHH_LOCUS.MXD DWM 05/31/13



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NAVAL COMPUTER & TELECOMMUNICATIONS AREA ATLANTIC DETACHMENT
CUTLER, MAINE

SITE LOCUS MAP

SOUTH HELIX HOUSE TRANSFER ROOM
WORK PLAN, PCB INVESTIGATION AT SOUTH HELIX HOUSE TRANSFER ROOM

SCALE	AS NOTED
FILE	I:\..\CUT_SHH_LOCUS.MXD
REV 0	DATE 05/31/13
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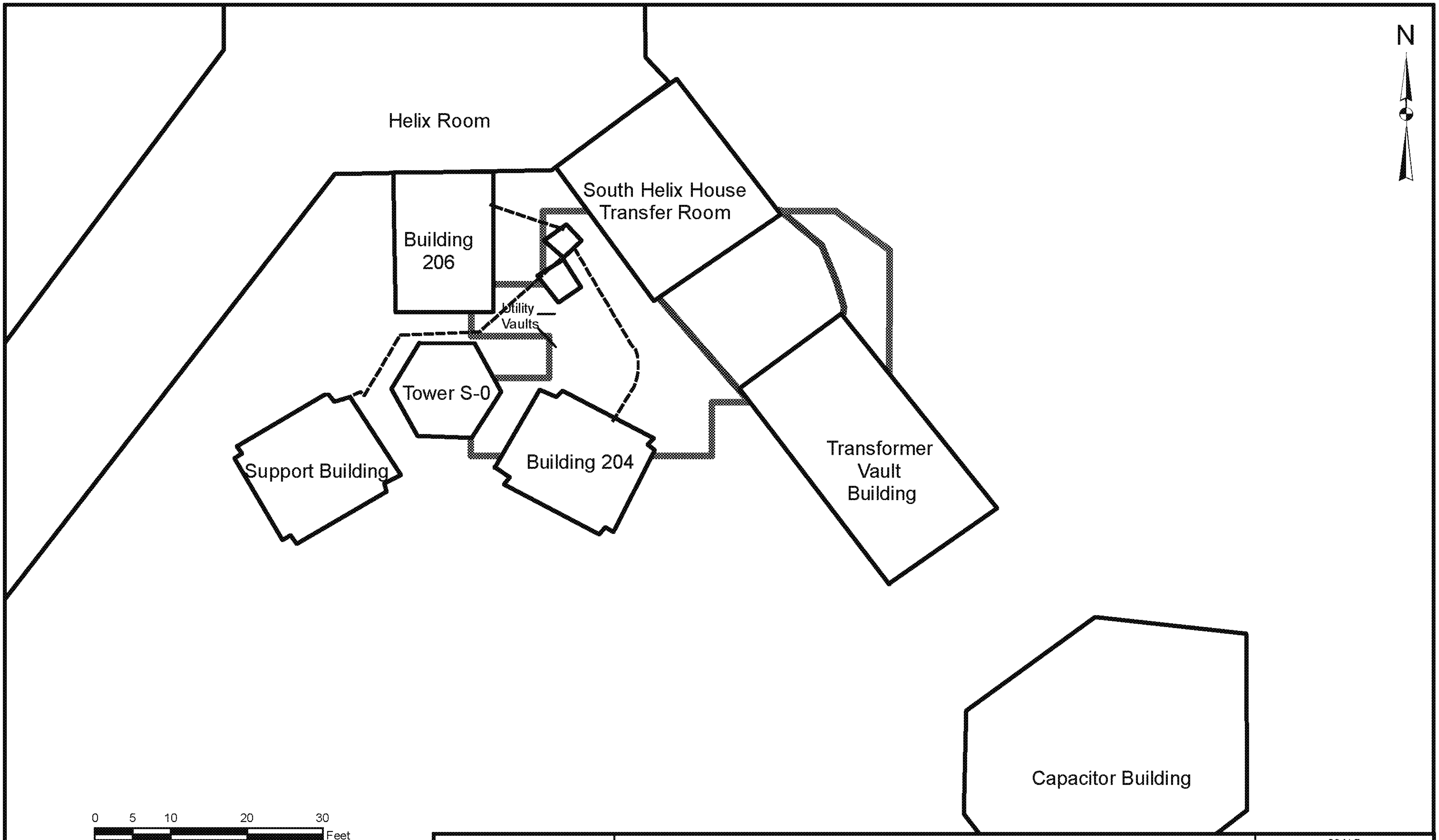

Legend

Historical Soil Removal Areas

- 2009 Soil Removal
- 2010 Soil Removal
- Approximate Location of Underground Electric Lines

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NAVAL COMPUTER & TELECOMMUNICATIONS AREA ATLANTIC DETACHMENT
CUTLER, MAINE

SITE PLAN AND HISTORICAL REMOVAL AREAS

SOUTH HELIX HOUSE TRANSFER ROOM
WORK PLAN, PCB INVESTIGATION AT SOUT HELIX HOUSE TRANSFER ROOM

SCALE	
AS NOTED	
FILE	
I:\..\SHH_SITE_PLAN.MXD	
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FIGURE NUMBER	
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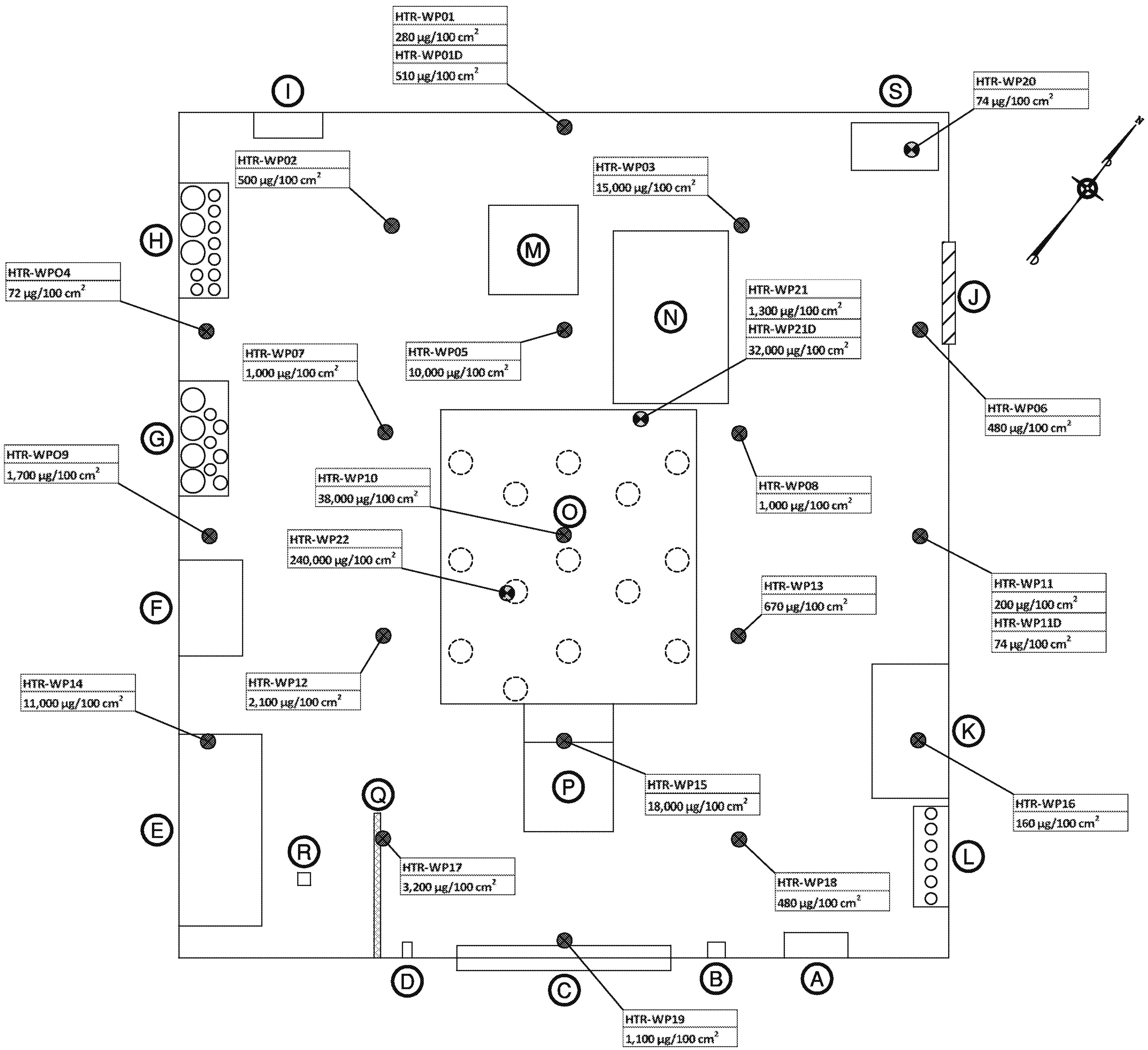

Legend

A. Distribution panel
B. Fire alarm
C. Doorway
D. Fire alarm
E. De-ice panel (out of service)
F. PLC control cabinet
G. Communication control panel
H. Communication control panel
I. Distribution panel
J. Louver window
K. Dry transformer
L. Control panel
M. Power panel
N. Dry transformer (pad-mounted)
O. Switching unit (elevated off floor)
P. Oil filled transfer switch
Q. Channel in floor
R. 4-inch (approximate) hole in floor
S. Reported historic location of former switch

Conduit

Support structure and/or conduit

Primary grid wipe sample location

Contingency grid wipe sample location

Note:

1. The following PCB Aroclors were analyzed for: 1016, 1221, 1232, 1242, 1248, 1254, and 1260.
2. Source of analytical results from Final South Helix House, Helix Transfer Room, Polychlorinated Biphenyls, Hazardous Materials Survey Report, Baker, February 2013.

GRAPHIC SCALE

0' 3' 6'

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NAVAL COMPUTER AND TELECOMMUNICATIONS AREA ATLANTIC
DETACHMENT CUTLER
CUTLER, MAINE

WIPE SAMPLE LOCATIONS AND TOTAL PCBs
SAMPLE RESULTS - SEPTEMBER 2012

SOUTH HELIX HOUSE TRANSFER ROOM
WORK PLAN, PCB INVESTIGATION AT SOUTH HELIX HOUSE TRANSFER ROOM

FILE	SCALE
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FIGURE NUMBER	REV	DATE
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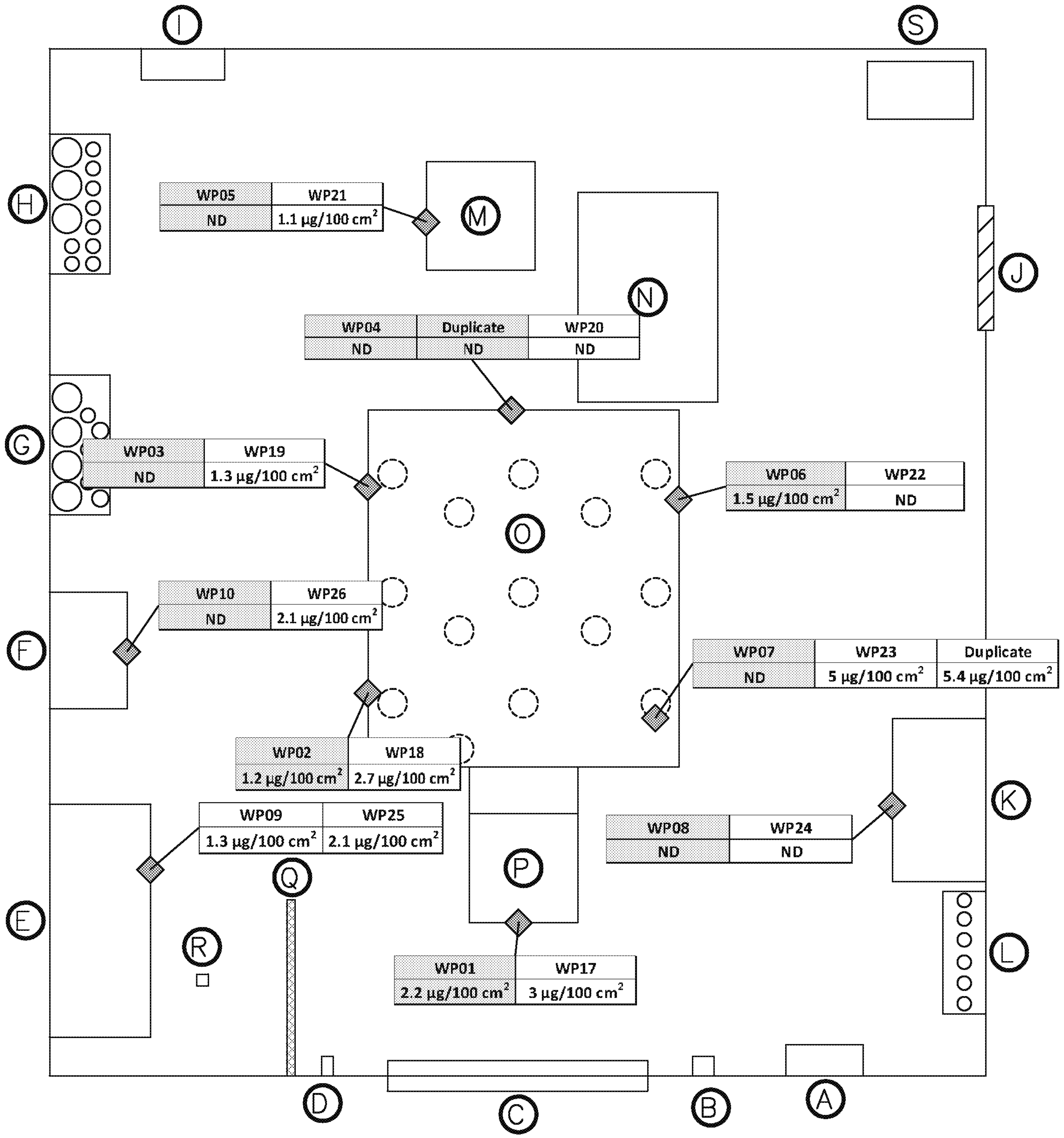

Legend
A. Distribution panel
B. Fire alarm
C. Doorway
D. Fire alarm
E. De–ice panel (out of service)
F. PLC control cabinet
G. Communication control panel
H. Communication control panel
I. Distribution panel
J. Louver window
K. Dry transformer
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M. Power panel
N. Dry transformer (pad–mounted)
O. Switching unit (elevated off floor)
P. Oil filled transfer switch
Q. Channel in floor
R. 4–inch (approximate) hole in floor
S. Reported historic location of former switch

Conduit

Support structure and/or conduit

Equipment wipe sample location

Pre-Clean Sample ID	Post-Clean Sample ID
Exceedance	Result

Notes:
–Wipe sample action limit is 10 $\mu g/100cm^2$
–Wipe sample surface area: 10 cm by 10 cm
–Results are preliminary – have not been validated
–Collocated pre–cleaning and post–cleaning wipe samples collected from adjoining surfaces

GRAPHIC SCALE
0' 3' 6'

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NAVAL COMPUTER AND TELECOMMUNICATIONS AREA ATLANTIC
DETACHMENT CUTLER
CUTLER, MAINE

EQUIPMENT SAMPLE RESULTS FOR
TOTAL DETECTED AROCLORS

SOUTH HELIX HOUSE TRANSFER ROOM
PCB INVESTIGATION AT SOUTH HELIX HOUSE TRANSFER ROOM

FILE	SCALE
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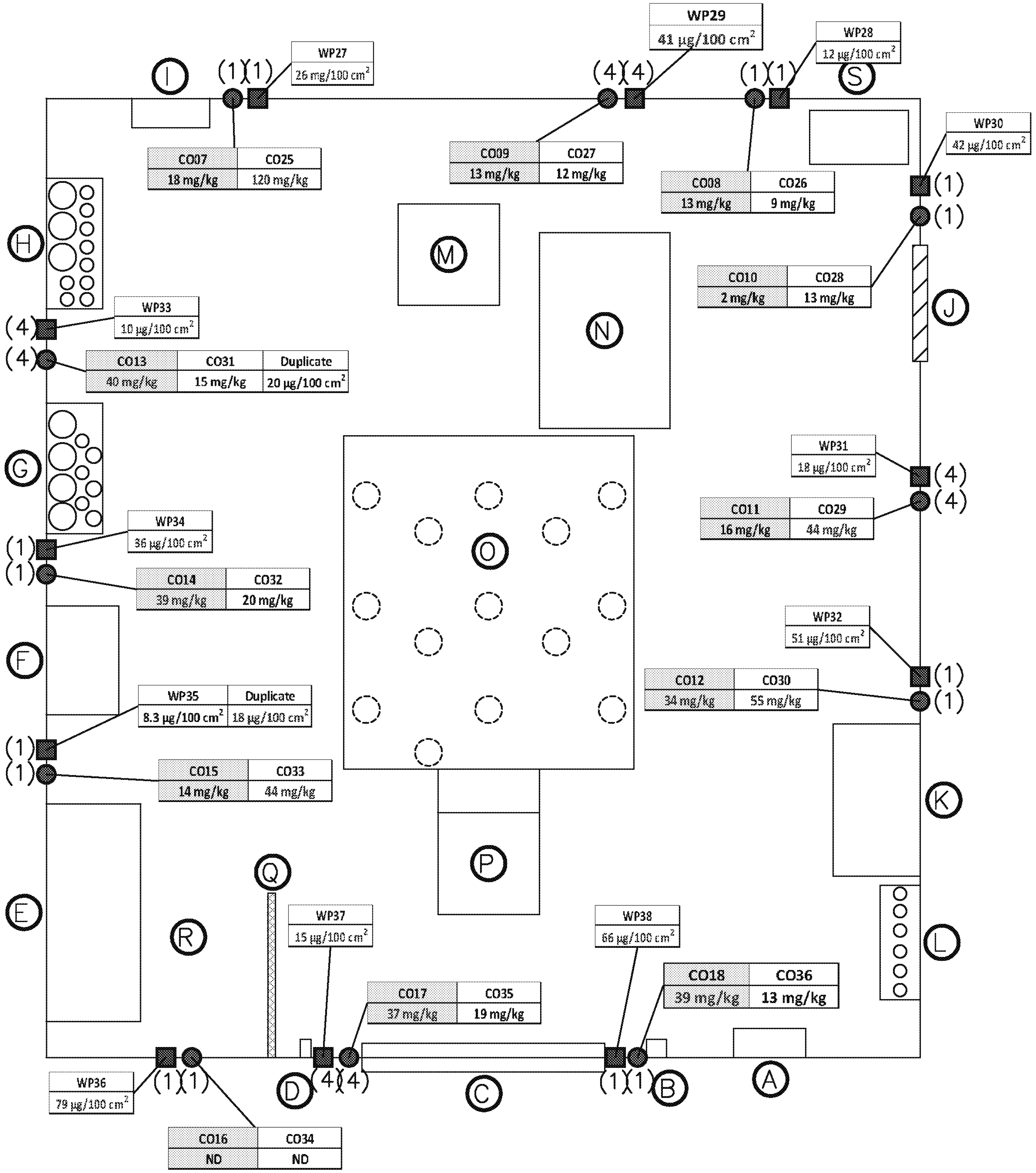

Legend
A. Distribution panel
B. Fire alarm
C. Doorway
D. Fire alarm
E. De-ice panel (out of service)
F. PLC control cabinet
G. Communication control panel
H. Communication control panel
I. Distribution panel
J. Louver window
K. Dry transformer
L. Control panel
M. Power panel
N. Dry transformer (pad-mounted)
O. Switching unit (elevated off floor)
P. Oil filled transfer switch
Q. Channel in floor
R. 4-inch (approximate) hole in floor
S. Reported historic location of former switch

Conduit

Support structure and/or conduit

(1) Bulk concrete sample location (number in parenthesis indicates distance (feet) above floor the sample was collected)

(1) Wall wipe sample location (number in parenthesis indicates distance (feet) above floor the sample was collected)

Notes:
- Wipe sample action limit is 10 µg/100cm²
- Wall wipe samples were only collected post-cleaning
- Wipe sample surface area: 10 cm by 10 cm
- Concrete sample action limit is 25 mg/kg
- Results are preliminary - have not been validated

Pre-Clean Sample ID	Post-Clean Sample ID
Exceedance	Result

GRAPHIC SCALE 0' 3' 6'

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NAVAL COMPUTER AND TELECOMMUNICATIONS AREA ATLANTIC DETACHMENT CUTLER CUTLER, MAINE

WALL SAMPLE RESULTS FOR TOTAL DETECTED AROCLORS

SOUTH HELIX HOUSE TRANSFER ROOM
PCB INVESTIGATION AT SOUTH HELIX HOUSE TRANSFER ROOM

FILE	SCALE
I:\..\SHH_TR_SAMP_WALL_LOC_POST.DWG	PER SCALE BAR

FIGURE NUMBER	REV	DATE
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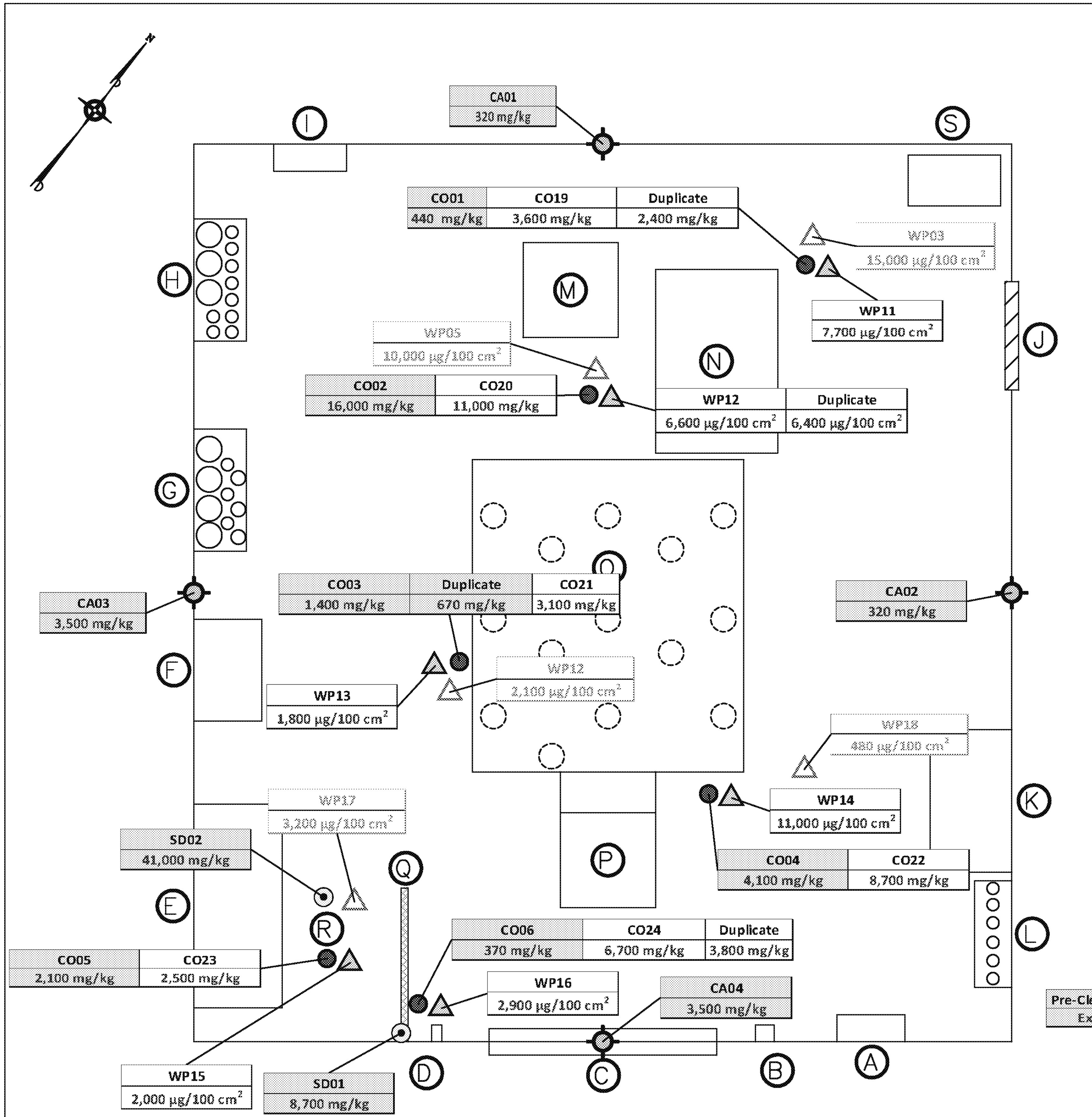

Legend
A. Distribution panel
B. Fire alarm
C. Doorway
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E. De-ice panel (out of service)
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N. Dry transformer (pad-mounted)
O. Switching unit (elevated off floor)
P. Oil filled transfer switch
Q. Channel in floor
R. 4-inch (approximate) hole in floor
S. Reported historic location of former switch

Conduit
Support structure and/or conduit
Bulk concrete sample location
Floor wipe sample location
Floor wipe sample location (2012) Baker Investigation
Caulking sample location
Solids sample location

Notes:
- Wipe sample action limit is 10 µg/100cm²
- Wipe sample surface area: 10 cm by 10 cm
- Concrete, caulking and solids sample action limit is 25 mg/kg
- Results are preliminary – have not been validated
- Caulking samples were only collected pre-cleaning

Pre-Clean Sample ID	Post-Clean Sample ID	Baker Sample 2012
Exceedance	Result	Result

GRAPHIC SCALE
0' 3' 6'

TriEco Tt
A Joint Venture

NAVAL COMPUTER AND TELECOMMUNICATIONS AREA ATLANTIC
DETACHMENT CUTLER
CUTLER, MAINE

FLOOR SAMPLE RESULTS FOR
TOTAL DETECTED AROCLORS

SOUTH HELIX HOUSE TRANSFER ROOM
PCB INVESTIGATION AT SOUTH HELIX HOUSE TRANSFER ROOM

FILE	SCALE
I:\..\SHH_TR_SAMP_FLOOR_LOC_POST.DWG	PER SCALE BAR

FIGURE NUMBER	REV	DATE
6	0	9/27/13

Appendix A: Sampling and Analysis Plan

Revised Final

Work Plan for PCB Investigation at South Helix House Transfer Room

NCTAMS LANT DET Cutler
Cutler, Maine

August 2013

Prepared for:
Department of the Navy
Naval Facilities Engineering Command, Mid-Atlantic
Norfolk, Virginia

Prepared by:
TriEco-Tt
1230 Columbia Street, Suite 1000
San Diego, California 92101

Prepared under:
Naval Facilities Engineering Command
Contract Number N62473-11-D-2205
Delivery Order WE01

W5213862RF

Revised Final

Work Plan for PCB Investigation at South Helix House Transfer Room Cutler, Maine

Contract Number N62473-11-D-2205
Delivery Order WE01

PREPARED FOR:

DEPARTMENT OF THE NAVY
Naval Facilities Engineering Command, Mid-Atlantic
Norfolk, Virginia

REVIEW AND APPROVAL

Project Manager: James R. Fowlk Date: 8/2/13

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1 Key Personnel

ACRONYMS AND ABBREVIATIONS

μg/cm2	Microgram per centimeters squared
CFR	Code of Federal Regulations
CRZ	Contamination-Reduction Zone
CTO	Contract Task Order
EPA	U.S. Environmental Protection Agency
EZ	Exclusion Zone
HASP	Health and Safety Plan
HEPA	high-efficiency particulate air
HF	High Frequency
HSWA	Hazardous and Solid Waste Amendments Act
ID	identification
LANT DET	Atlantic Detachment
MEDEP	Maine Department of Environmental Protection
NAVFAC MIDLANT	Naval Facilities Engineering Command Mid-Atlantic
Navy	Department of the Navy
NCTAMS	Naval Computer and Telecommunications Area Master Station
NFPA	National Fire Protection Association
PCBs	polychlorinated biphenyls
PPE	Personal Protective Equipment
ppm	parts per million
RA	Remedial Action
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and analysis plan
TSCA	Toxic Substance Control Act
U.S.	United States

ACRONYMS AND ABBREVIATIONS (CONTINUED)

VIN	Vehicle Identification Number
VLF	Very Low Frequency

1.0 INTRODUCTION

This Remedial Action Work Plan (RAWP) describes a proposed investigation and subsequent remedial action (RA) for polychlorinated biphenyl (PCB)-contaminated surfaces within the South Helix House Hoist Transfer Room (the South Helix House Transfer Room, or, the Transfer Room), located at the Naval Computer and Telecommunications Area Master Station (NCTAMS) Atlantic Detachment (LANT DET) Cutler, in Cutler, Maine. The contamination resulted from a past (1980's) spill of approximately 40 to 50 gallons of PCB-laden dielectric oil from a switch in the Transfer Room. TriEco-Tt has been retained by the United States (U.S.) Department of the Navy (Navy), Naval Facilities Engineering Command Mid-Atlantic (NAVFAC MIDLANT), under Contract Number N62473-11D-2205, Contract Task Order (CTO) WE01 to prepare this work plan and to conduct a self-implementing RA for the PCB-contaminated surfaces within the Transfer Room. These activities will be undertaken in accordance with the Toxic Substances Control Act (TSCA), 40 Code of Federal Regulations (CFR) 761, as well as Maine Department of Environmental Protection (MEDEP) Hazardous Waste Management Regulations.

1.1 NCTAMS CUTLER FACILITY DESCRIPTION AND ACCESS

The NCTAMS Cutler facility is located on a 2,800-acre peninsula on the coast of eastern Maine, as illustrated on Figure 1. Established in June of 1961, NCTAMS Cutler is an active communications facility that provides radio signal transmissions to U.S. ships and submarines operating primarily in the North Atlantic and Arctic Oceans and the Mediterranean Sea. The Cutler facility was formerly comprised of three principal units: (1) the Administrative and Housing Area; (2) the High Frequency (HF) Area; and (3) the Very Low Frequency (VLF) Area. The Administrative and Housing Area was transferred to the Cutler Development Corporation in December 2003. The HF and VLF Areas continue to operate on Navy-owned land.

The VLF Area is the location of the Cutler VLF transmitter and supports two VLF antenna arrays consisting of a northern and a southern array. The panels in each antenna array are supported by 13 main towers: a center tower surrounded by six inner ring towers and six outer ring towers (Figure 1). Each center tower is adjacent to a helix house and several other support buildings. The South Helix House is located at the center of the southern VLF antenna array. The South Helix House support buildings include: the Hoist Transfer Room; the Transformer Vault Building; the Helix Room; and Buildings 204, 206, and an unnumbered support building located at the southwest perimeter of Tower S-0 (Figure 2).

The South Helix House, where the RA will be conducted, is located within the secured boundaries of the active Cutler facility. Access to the South Helix House is limited to Cutler base personnel and is restricted by base security; access can only be gained through a base security checkpoint located in the northern portion of the base along Ridge Road (the entrance to the Cutler facility is accessed via Ridge Road, located approximately 1.5 miles west of Route 191 in Cutler).

The frequency of access to the South Helix House Transfer Room meets the TSCA definition of a "low occupancy area" (less than 6.7 hours per week). Access to the Transfer Room is controlled by the Cutler Telecommunications Manager and the room is locked and secured. No access may be gained without coordination with the Cutler Telecommunications Manager. There is currently no residential or recreational use of the site, and children are not permitted access. The plausible exposure scenarios for the South Helix House are excavation worker, construction worker, and outdoor commercial worker.

1.2 Applicable Regulations

Two regulatory programs are applicable to the PCB-related remedial actions planned for the South Helix House: the Maine Hazardous Waste Management Rules program and the TSCA program, as discussed below.

Maine Hazardous Waste Management Rules - PCBs are regulated as a hazardous waste in Maine under the Maine Hazardous Waste Management Rules. The State provides oversight of PCB cleanups under its Resource Conservation and Recovery Act (RCRA) Corrective Action Program if PCBs are detected at levels less than 50 ppm. MEDEP is authorized by U.S. Environmental Protection Agency under RCRA to enforce the state Maine Hazardous Waste Management Rules as equivalents to RCRA regulations.

TSCA: Per section 40 CFR 761.1(b)(1), the TSCA program is applicable to the remediation of the site due to the detection of PCBs on surfaces within the South Helix House Hoist Transfer Room resulting from a spill of PCB-containing dielectric oil. The detection of PCBs in surface wipe samples indicates a PCB release occurred at the site, and meets the following TSCA qualifier in 40 CFR 761.1(c)(3): "materials containing PCBs as a result of spills".

1.3 Objective

As stated in Section 1.0, the objective of the work detailed in this RAWP is to complete a PCB removal action meeting the TSCA and MEDEP requirements. This removal action will be completed by conducting a self-implementing on-site cleanup and disposal in accordance with 40 CFR 761.61(a), Self-Implementing on-site cleanup and disposal of PCB remediation waste. Notification to the EPA will be made in accordance with 40 CFR 761.61(a)(3), Notification and Certification. TSCA cleanup standards rely on the determination of whether an area is classified as either a high or low occupancy area, with more stringent requirements for high occupancy areas.

The PCB removal action will address concrete (porous surfaces/media) adversely impacted by PCB concentrations above the target cleanup level. PCB cleanup levels are identified in 40 Code of Federal Regulation (CFR) Part 761.125(c)(3). In addition, Polychlorinated Biphenyl (PCB) Site Revitalization Guidance Under the Toxic Substance Control Act (TSCA), dated November 2005, prepared by EPA, was also used as guidance only. The revitalization guidance and federal regulations listed above describe self-implementing cleanup levels for various scenarios taking into account the amount of PCB in the original spill, nature of contaminated surface (porous or non-porous) and occupancy level (high or low) of the space were the spill occurred. The spill in the Helix House Transfer Room is classified as a PCB spill of greater than 50 parts per million (ppm), impacting a porous surface. In addition, the guidance document states that a high-occupancy area is defined as a space occupied by individuals not wearing dermal and respiratory protection for more than 335 hours a year or 6.7 hours per week. The Helix House Transfer Room is used to house electrical distribution equipment and is only occupied during routine maintenance; it is classified as a low-occupancy area. The cleanup goals are 10 micrograms per 100 square centimeters (µg/100 cm2) for wipe samples, and 25 milligrams per kilogram (mg/kg) for bulk samples.

The removal action will remedy concrete and, if applicable, other porous surfaces/media, including equipment cabinet exteriors and caulking that have been contaminated at PCB concentrations above the target cleanup level. The removal action is being conducted to obtain closure pursuant to the requirements outlined in TSCA (40 CFR part 761), and in accordance with the Maine Hazardous Waste Management Rules.

1.4 WORK PLAN ORGANIZATION

This RAWP has been prepared for regulatory review of the RA designed to remove PCB-residue within the South Helix House Transfer Room resulting from a past release that occurred within that room. Section 1 of this RAWP provides a summary of the general purpose and scope of the planned RA, a description of the NCTAMS Cutler facility, a listing of applicable regulations, and the objective of the planned work. Section 2 provides background information, including brief descriptions of the former PCB oil spill and the Transfer Room, information on a previous investigation and the extent of the PCB release, and temporary actions that have been conducted. Section 3 lists the major tasks being conducted under this work plan, including task work required for decontamination and encapsulation of contaminated surfaces, and disposal requirements.

The site-specific Sampling and Analysis Plan (SAP), detailing pre-cleaning and confirmation sampling activities, is provided as Appendix A. The site-specific Health and Safety Plan (HASP) is provided under separate cover.

1.5 PROJECT TEAM ORGANIZATION AND SCHEDULE

Table 1 lists the key personnel, along with their roles on the project. Contact information is also presented in this table.

2.0 BACKGROUND

Descriptions of the PCB oil spill, the South Helix House Transfer Room, a previous investigation, and temporary actions taken by the Navy are presented below.

2.1 PREVIOUS SAMPLING AND REMEDIATION ACTIONS

During the mid-1980s, approximately 40 to 50 gallons of PCB- dielectric oil were reportedly spilled from a switch located within the Transfer Room section of the South Helix House. The oil is believed to have leaked onto the floor and then migrated outside the door of the Transfer Room, affecting surface soils located between the Transfer Room, the Transformer Vault Building, and Tower S-0 (EA, 2000). In 1993, an analysis of the oil from the switch detected the presence of PCBs (Aroclor 1260) at a concentration of 780,000 parts per million (ppm) (EA, 2000). Based upon the evaluation of soil sampling data collected from the site as part of the Environmental Restoration Program (ERP, see below), the oil migrated downward through the soils to varying depths throughout the release area.

Sampling of soils in the vicinity of the South Helix House was conducted under the ERP in 1996, 1998, 1999, and 2000, and removal actions were conducted in 1999 and 2000.

2.2 TRANSFER ROOM DESCRIPTION

The Transfer Room (Room 40) is located within the South Helix House (Building 101), which feeds lighting for the Southern Antenna Array; a description of the Transfer Room is presented below. Much of the information that follows was obtained during a May 6, 2013 site visit by TriEco-Tt.

The Transfer Room, constructed in 1960, is 22 feet long, 20 feet wide and approximately 10 feet high. The construction of the interior of the room is cinder block walls with a concrete slab floor. According to Cutler base personnel, an approximate 4-inch-diameter hole was drilled into the concrete slab to allow standing water to drain from the floor. A channel in the concrete slab, which also functions to drain standing water from electrical equipment, is present to the west of the entryway. The hole and channel locations are shown on Figure 3. It is not known if these building features were in place prior to the PCB oil spill which occurred in the mid-1980s.

The electrical equipment currently existing in the Transfer Room is also shown on Figure 3. The main power feed of 4,160 volts of electricity is fed from the power plant to the Transfer Room, which powers a number of components, including the aircraft warning lights atop the Southern Array antenna towers. Two dry transformers are located in the eastern and northern portions of the building. There is one access point to the building, a locked doorway located along the southern wall, as well as a single louver window in the northeast corner of the building.

2.3 PREVIOUS TRANSFER ROOM SURFACE WIPE SAMPLING INVESTIGATION

In September 2012, Michael Baker Jr., Inc. (Baker) conducted a PCB Hazardous Materials Survey at the Hoist Transfer Room on behalf of the Navy. The survey was coordinated with MEDEP. As part of the PCB Hazardous Materials Survey, base personnel were interviewed regarding the spill. According to Baker, site personnel could not confirm that the spill occurred, however, they estimated that if the spill had occurred, the most probable location was an oil-filled switch located in the northeast corner of the Transfer Room. This switch was reportedly removed sometime in the mid- to late 1980s (Baker, 2013). A February 1960 drawing obtained from the NCTAMS Cutler Public Works Department (DON, 1960) does not show a switch in the northeast corner of the Transfer Room.

During the field inspection survey, Baker noted there were no visual indications of a previous spill within the room or on the walls. The floor and walls appeared to be generally clean with no large scale discolored or stained areas and no oily residues were observed. Some dark staining was observed around the supports of the main transfer switch located in the center of the room. There was also evidence of fluid migration through the concrete floor as concrete located under the temporary flooring and near equipment was damp at the time of the site visit. In addition, there was evidence of fluid migration on the floor and walls in the form of secondary efflorescence. Efflorescence is a white crystalline mineral salt left on masonry surfaces as fluid carrying salts and traces of minerals migrates through masonry and evaporates. (Baker, 2013)

During the PCB Hazardous Materials Survey a total of 19 primary environmental surface wipe samples were collected from the suspected spill area in a hexagonal grid pattern, following procedures outlined in the SAP (Baker, 2012). Three additional field-located, discretionary samples were collected, based on historic information and visual observations. The associated previous wipe sample locations and PCB results are shown on Figure 3.

Sample HTR-WP20 was collected in the northeast corner of the room at the location where the switch equipment was reportedly located at the time of the release. This equipment has since been removed from the room. Samples HTR-WP21 and HTR-WP22 were located in stained areas of the floor.

PCB Aroclor-1260 was detected in all wipe samples collected within the Transfer Room. Concentrations of Aroclor-1260 ranged from 72 micrograms per 100 centimeters squared ($\mu g/100cm^2$) to 240,000 $\mu g/100cm^2$. All wipe sample results were used for determination of the presence or absence of PCB on surfaces only.

2.4 TEMPORARY ACTIONS

In October 2012, based on the results of the PCB Hazardous Materials Survey, the Navy took action to reduce the potential for worker exposure to PCBs in the South Helix House Transfer Room. This action consisted of: covering the floor with heavy plastic sheeting to prevent any potential worker exposure to the PCB-contaminated floor; placing plywood sheets over the plastic sheeting to prevent slip hazards; and placing controls on worker access to the South Helix House Transfer Room. As the room contains equipment that is mission-essential, the room must be accessed occasionally (an estimated two to three times each month) to perform essential functions. Only a limited number of personnel are authorized to enter the room, and a lock was installed on the door to prevent unauthorized access. Work in the building is being strictly managed to ensure that the building is accessed only when necessary to support mission-essential work until a corrective action is implemented.

3.0 REMEDIAL ACTION ACTIVITIES

The activities associated with this RAWP are intended to meet the cleanup goals presented in Section 1.3 within the South Helix House Transfer Room. This section describes the activities associated with the PCB decontamination to be conducted for the floor, walls, and other elevated surfaces. This RAWP specifies the decontamination and /or possible encapsulation of PCB-contaminated surfaces within the Transfer Room, performed in compliance with MEDEP closure provisions and TSCA (40 CFR 761) requirements. This RAWP consists of the following major tasks to be implemented by TriEco-Tt and its RA subcontractor (the subcontractor):

3.1 Task 1 - Remedial Action Work Plan

Task 1 covers the preparation of this work plan, which consists of the following activities:

- Preparing this Draft RAWP to be submitted by Navy to MEDEP for review.
- Preparing responses to MEDEP comments on the Draft RAWP.
- Preparing a Final RAWP to be submitted by Navy to MEDEP for approval.

3.2 TASK 2 – PRE-CLEANING SAMPLING

Prior to the initiation of cleaning/decontamination activities in the South Helix House Transfer Room, temporary plywood and plastic sheeting will be removed from the floor by the subcontractor to enable access to the floor for sampling. These materials are considered to be impacted by PCBs and will be placed in 1-cubic-yard containers upon their removal. The temporary flooring will be handled using appropriate personal protective equipment (PPE) and safe work practices. Filled containers will be stored in a conex box located at a designated area identified by NCTAMS Cutler personnel, pending appropriate offsite disposal.

Following the removal of these materials, pre-cleaning samples will be collected by TriEco-Tt to further delineate existing PCB contamination of surfaces and materials. Pre-cleaning samples will include both bulk samples and surface wipe samples, summarized below. Detailed sampling procedures are included in the SAP (Appendix A).

Pre-cleaning surface wipe sampling will include a total of ten (10) samples for PCB analysis, to be collected from select equipment cabinet exteriors in the South Helix Transfer Room at approximate locations illustrated on Figure 4.

- The six concrete floor samples will include four locations where elevated PCBs were identified during initial site characterization efforts conducted in 2012 (Baker, 2012), and two to be collected at the location where a drainage channel was observed and from the location where a 4-inch hole was observed.

- The twelve concrete wall samples will include three bulk samples to be collected from each of the four walls: for each wall, two samples will be located approximately 1 foot above the floor, and one sample will be located approximately 4 feet above the floor.

- The four caulking samples will include one from a location along each of the four floor-wall gap junctions at each wall.

3.3 TASK 3 – DECONTAMINATION AND CONFIRMATORY SAMPLING

The decontamination and cleaning task will commence immediately following completion of the pre-cleaning sampling task. Two consecutive decontamination events will be conducted to remove PCB contamination from the walls, floor, and equipment of the South Helix House Transfer Room.

Prior to cleaning activities commencing, TriEco-Tt's National Fire Protection Association (NFPA)-qualified electrical engineer will perform ground continuity tests on the active high-voltage electrical equipment to verify that all equipment is properly grounded to ensure worker and equipment safety.

After grounding verification is confirmed, electrical equipment will be isolated from personnel and cleaning activities by wrapping equipment with plastic. This will be achieved through the use of a combination of polyethylene sheeting and scaffolding/zip walls. Any floor openings will be sealed prior to cleaning activities to ensure no potential migration of PCB residue. To ensure proper ventilation of the two dry transformers present, the TriEco-Tt electrical engineer will monitor the transformers during the cleaning activities for signs of overheating. At the end of each work day, the two transformers will have the plastic covering removed to ensure proper ventilation overnight. The transformers will be wrapped prior to commencing work each day.

Floor and wall decontamination activities will be performed by the subcontractor under the direction and observation of TriEco-Tt personnel. Floor and wall surfaces below 8 feet in height will be cleaned with a solution of water and soap, and will be hand-scrubbed. Wall surfaces above 8 feet will be cleared of visual dust and debris using high-efficiency particulate air (HEPA) vacuums or equivalent. Electrical equipment panels and enclosures will be wiped with cleaning cloths dampened with a solution of water and detergent.

Due to the presence of high-voltage electrical equipment, all cleaning activities will be completed with a minimal volume of water applied with a hand-sprayer. All surfaces will be cleaned manually with brushes.

All cleaning fluids and rinse water generated during decontamination activities will be captured and not allowed to migrate beyond the Transfer Room. All liquid and solid waste generated during decontamination activities, including PPE, will be containerized in 55-gallon drums. Due to the age of the building, it is assumed that the paint on the walls contain lead and PCB and, as such, all wash rinsate water resulting from decontamination of the walls will be analyzed for characterization, development of the waste profile, and off-site disposal to a permitted facility.

At completion of the decontamination and cleaning activities, TriEco-Tt will collect post-cleaning confirmatory samples including co-located surface wipe and bulk concrete samples for PCB analysis and reporting, with the wipe samples to be collected prior to the bulk concrete samples.

Confirmation surface wipe sampling will include a total of 28 locations, including 6 floor wipes, 12 wall surface wipes, and 10 equipment cabinet exterior surface wipes. The wall and floor confirmation wipe samples will be collected at locations adjacent to the wall and floor confirmation bulk concrete samples (below).

The confirmation wipe samples from equipment cabinet exteriors will be co-located with the pre-cleaning equipment wipe sample locations.

The confirmation wipe sample locations are shown on Figure 5.

Confirmation bulk concrete sampling will be conducted at six floor locations and twelve wall locations, each adjacent to the original pre-cleaning concrete sample locations, discussed above. The samples from the floor will be collected prior to the wall samples. The confirmation concrete sample locations are shown on Figure 5.

After the confirmation samples have been collected and pending the receipt of confirmation sample analytical results, new temporary flooring consisting of plastic sheeting covered by plywood sheets will be installed.

3.4 TASK 4 – ADDITIONAL WASHING AND/OR ENCAPSULATION ACTIVITIES

Based on the analytical results of confirmatory samples, additional measures may be necessary to meet the project objectives, if PCB levels have not yet reached cleanup goals as stated in Section 3.1. Additional washing and/or encapsulation activities, if warranted, will be conducted as directed by the Navy. Prior to implementing any encapsulation activities, TriEco-Tt will provide the Navy with analytical results for the pre-cleaning samples and for the post-cleaning/decontamination confirmatory samples, along with recommendations for specific areas to be encapsulated.

If required, the encapsulation activities will be performed by the subcontractor. Encapsulation of surface areas not meeting PCB cleanup goals (Section 3.1) will consist of applying two coats of a low or non-volatile organic compound, durable latex paint or similar material. Contrasting colors will be used for the layers, red for the base coat, and gray for the top (wearing) coat. Appropriate PPE will be worn during the encapsulation process and fans will be provided and used to ensure adequate ventilation.

3.5 TASK 5 - REMEDIAL ACTION CLOSE-OUT REPORT

Task 5 covers the preparation of the - Remedial Action Close-Out Report, which consists of the following activities:

- Preparing a Draft Remedial Action Close-Out Report to be submitted by Navy to MEDEP for review.
- Preparing responses to MEDEP comments on the Draft Remedial Action Close-Out Report.
- Preparing a Final Remedial Action Close-Out Report to be submitted by Navy to MEDEP.

3.6 PERFORMANCE STANDARDS

This RAWP specifies the cleaning and possible encapsulation of PCB-contaminated surfaces (depending upon the post-cleaning analytical results of confirmation PCB samples) in accordance with TSCA (40 CFR 761). All work will be coordinated with NCTAMS for mission requirements. Other requirements are discussed below.

3.6.1 Coordination with Roofing Contractor

It is anticipated that replacement of the roof at the South Helix House will be underway during the field work covered by this work plan. Prior to commencing work, TriEco-Tt will coordinate activities with the roofing contractor to prevent contractor personnel from potentially contacting PCB-contaminated media. In addition, due to the overhead hazard associated with the roof replacement, TriEco-Tt will work with the roofing contractor to establish safe work areas for entry points to the Transfer Room and staging of equipment and supplies for its workers in order to minimize potential hazards and prevent delays to either project.

3.6.2 Exclusion and Decontamination Areas

The cleaning of PCB-contaminated surfaces and removal of PCB-contaminated material (rinsate wash water and temporary flooring) will occur within the Exclusion Zone (EZ), which will be isolated via the installation of temporary orange snow-fencing. All personnel working within the EZ will be required to wear Tyvek® coveralls, hard hats, disposable nitrile gloves, hearing and eye protection, as well as steel-toed boots covered with disposable foot protection (booties), in compliance with the site-specific HASP requirements for PPE. All PPE will be disposed of per the requirements provided in Section 3.6.3 of this RAWP.

The subcontractor will provide areas for the decontamination of personnel and equipment transitioning from the excavation area, also referred to as the EZ, via a Contamination-Reduction Zone (CRZ). The CRZ will be initially located at the entrance/exit of the EZ, and will be used as a transition area for personnel to remove and appropriately dispose of PPE into secured trash bags.

Poly sheeting used within the EZ and/or the CRZ will be containerized and disposed of in accordance with the requirements of Section 3.6.3 of this RAWP.

3.6.3 Disposal

Waste materials generated during the RA will be transported to an off-site disposal facility as soon as possible (within 90 days) to avoid exceeding any time restrictions on contaminated material storage. Anticipated waste streams are as follows:

- Removed temporary plywood flooring and polyethylene sheeting
- Decontamination wash water (detergent and PCB contaminated water)
- Used PPE and polyethylene sheeting
- General solid waste

The waste streams will be disposed of in accordance with all federal, state, and Department of the Navy (DON) policies and the following Maine Hazardous Waste Management Rules, including Chapter 851 Standards for Generators of Hazardous Waste and Chapter 852 Land Disposal Restrictions, and
and TSCA criteria

Waste materials that will be generated during the decontamination activities may include decontamination fluids and solids and used PPE. Waste will be containerized in drums; temporarily stored within a secure portable storage containers located at the site within the work staging area. The temporary Conex Box will be secured with a lock, with a key provided to the onsite TriEco-TT Representative. The waste materials will be stored in 55-gallon, open top, steel drums (ORNL UN Packaging Specification 1A2 [former DOT 17H]) for use. All waste containers will be labeled prior to temporary storage.

All waste accumulation, characterization, documentation, and transportation and disposal will be coordinated with Cutler environmental personnel. The location of temporary waste storage will be approved by Cutler environmental personnel prior to beginning remediation activities. Inspection of the storage containers, waste accumulation, all characterization and shipping documentation and transportation vehicles will be coordinated with Cutler environmental personnel as well. Cutler environmental personnel will approve all waste profiles and manifests and will also sign the manifests.

In order to prevent loss of material stored in containers or trucks, measures such as lined containers and trucks, or providing sealed tailgates on trucks, along with tarping containers or trucks will be performed. The subcontractor is responsible for satisfying all disposal requirements (solids and liquids) and providing all disposal facility sampling requirements, including disposal facility name, contact information (including permit number), waste profile, and responsible parties names.

The wastes to be disposed of under this subcontract have not yet been generated or characterized. Wastes will be generated through the removal of temporary flooring and through decontamination and possible encapsulation activities. The primary contaminants of concern at the site are PCBs, and potentially lead.

The wastes to be disposed are expected to have chemical constituents and concentrations similar to those indicated in previously collected site data. The wastes may also contain small quantities of detergents and isopropanol as a result of decontamination activities. The subcontractor will be responsible for any testing required to determine the appropriate facilities for disposal and meet all applicable state, federal, Navy, and disposal facility requirements.

3.7 OTHER RAWP IMPLEMENTATION REQUIREMENTS

Information on site access and security clearance, electrical utility safety, and subcontractor requirements is presented below.

3.7.1 Site Entry and Security Clearance

NCTAMS Cutler is an active military facility; therefore, security clearance is required prior to entering work areas. Rights-of-entry to the work areas will be provided to TriEco-Tt and its' subcontractor by the Navy.

At least 2 weeks before beginning on-site work, the TriEco-Tt Project Manager will provide Cutler environmental personnel information necessary to obtain security clearance to the NCTAMS Cutler facility for all TriEco-Tt employees and TriEco-Tt subcontractor employees performing work at the work area.

In addition, the vehicle registration, vehicle identification number (VIN), and proof of vehicle insurance will be submitted for all vehicles that will be used to access the facility. All vehicles used by the subcontractor will be clearly labeled with the company name.

The subcontractor will coordinate daily arrival times, daily departure times, and access arrangements with the TriEco-Tt Site Representative. Daily access to the Hoist Transfer Room will be coordinated by the TriEco-Tt Site Representative with Cutler environmental personnel daily.

The temporary waste storage container (conex box) will be secured with all accumulated waste and locked at the end of each work day. All equipment and supplies will be secured either within the work area (Hoist Transfer Room) or subcontractor vehicles at the end of the work day.

Prior to leaving the site at the end of the work day, the TriEco-Tt Site Representative will ensure that the Hoist Transfer Room is locked and secured to prevent unauthorized access.

3.7.2 Electrical Utility Safety

During all remediation activities, electrical power to the Transfer Room will be active. Due to the presence of high-voltage (4,160 volts) power and the small area of the room, TriEco-Tt will have a NFPA-certified electrical engineer onsite to ensure that proper health and safety procedures are followed. Site-specific requirements and hazard identification are included in the HASP.

Prior to commencing work, the TriEco-Tt electrical engineer will conduct a safety briefing for all personnel; the briefing will detail the hazards, requirements, and safe work practices associated with the anticipated work tasks.

3.7.3 RA Subcontractor Requirements

The subcontractor will be required to complete all work in accordance with this RAWP, subsequent RAWP revisions and/or addendums, the Technical Specification, TSCA (40 CFR 761) and Maine Hazardous Waste Management Rules requirements. The disposal of all waste streams will conducted in accordance with TSCA (40 CFR 761) and all applicable federal, state, and Navy regulations and policies and will be coordinated with Cutler environmental personnel.

4.0 REFERENCES

Baker, 2013. Final South Helix House, Helix Transfer Room, Polychlorinated Biphenyls Hazardous Materials Survey, NCTAMS LANT DET Cutler, Cutler, ME, February.

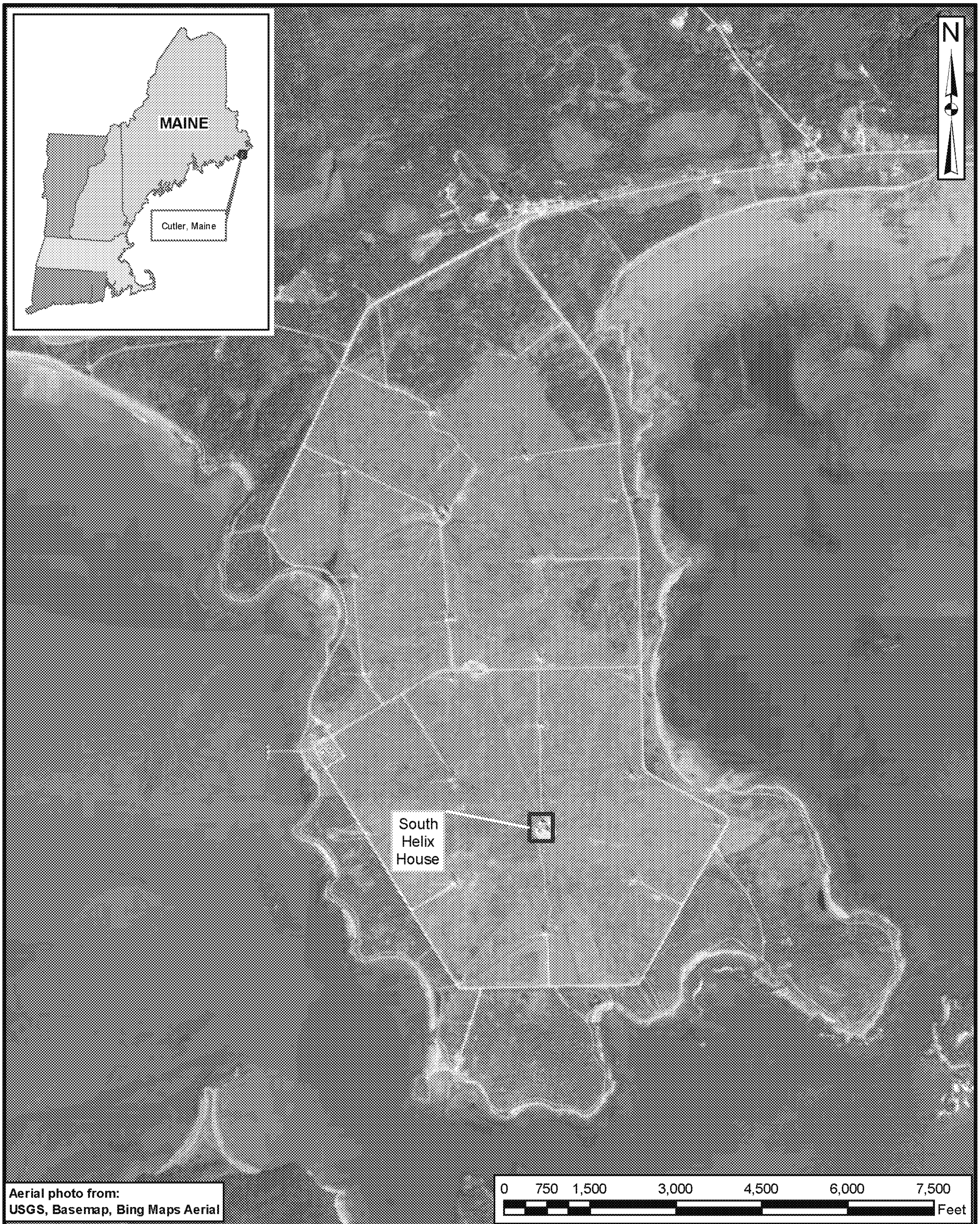
DON, 1960. Power and Control Wiring, Helix Houses – Electrical, U.S. Naval Radio Station (T), Cutler, Maine. Drawing No. 860787, February 9.

EA (EA Engineering, Science, and Technology, Inc.), 2000. Polychlorinated Biphenyl Oil-Filled Switch Spill Site Soil Sampling Documentation and Characterization Report, Naval Computer and Telecommunications Station, Cutler, Maine. December.

MEDEP, 2010. Hazardous Waste Regulations, Document No. 06-096, April 24.

FIGURES

I:\02585\SI.RP.S7\CUT_SHH_LOCUS.MXD DWM 05/31/13



TriEco
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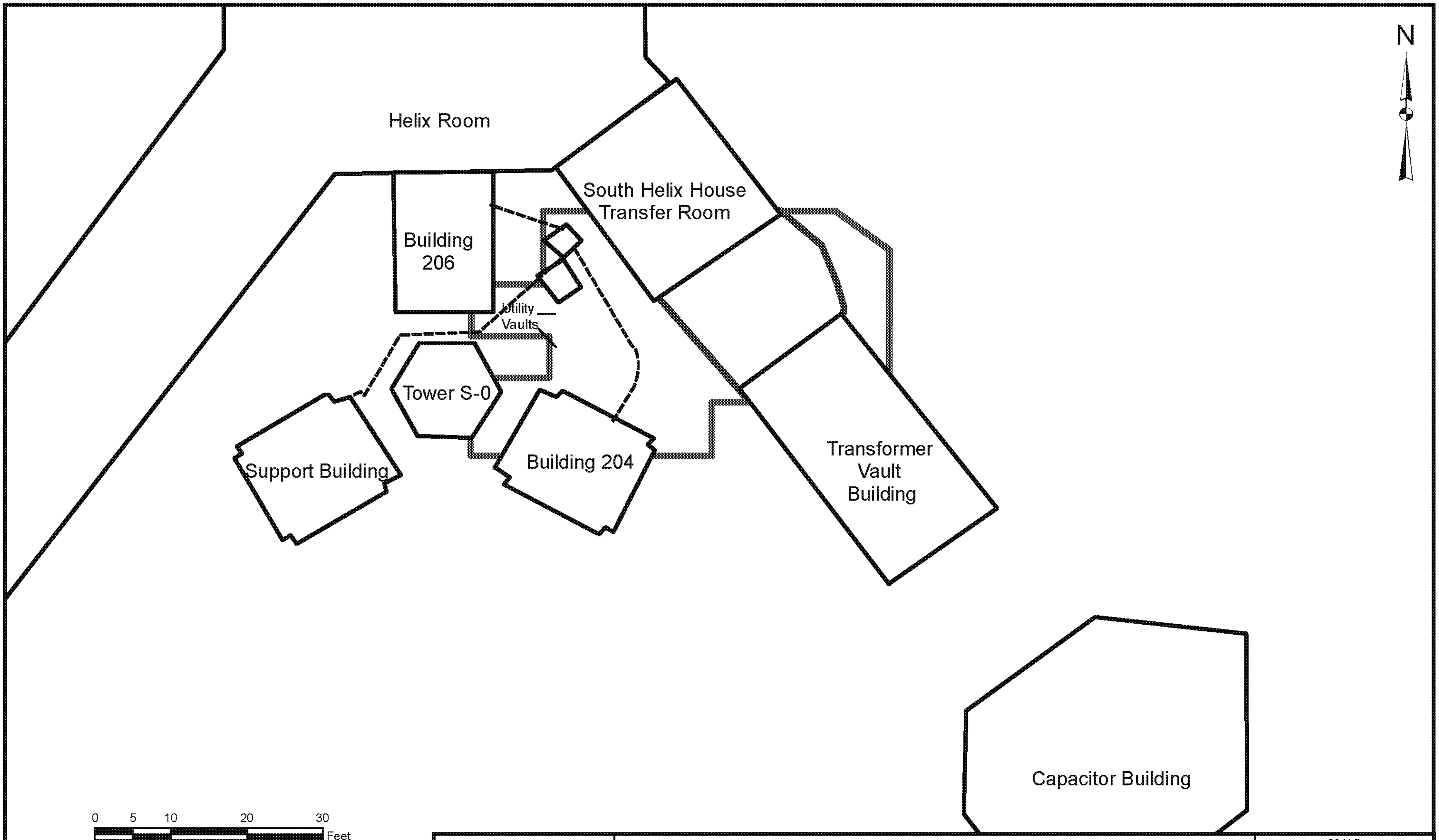
NAVAL COMPUTER & TELECOMMUNICATIONS AREA ATLANTIC DETACHMENT
CUTLER, MAINE

SITE LOCUS MAP

SOUTH HELIX HOUSE TRANSFER ROOM
WORK PLAN, PCB INVESTIGATION AT SOUTH HELIX HOUSE TRANSFER ROOM

SCALE	
AS NOTED	
FILE	
I:\..\CUT_SHH_LOCUS.MXD	
REV	DATE
0	05/31/13
FIGURE NUMBER	
1	



Legend

Historical Soil Removal Areas

- 2009 Soil Removal
- 2010 Soil Removal
- Approximate Location of Underground Electric Lines

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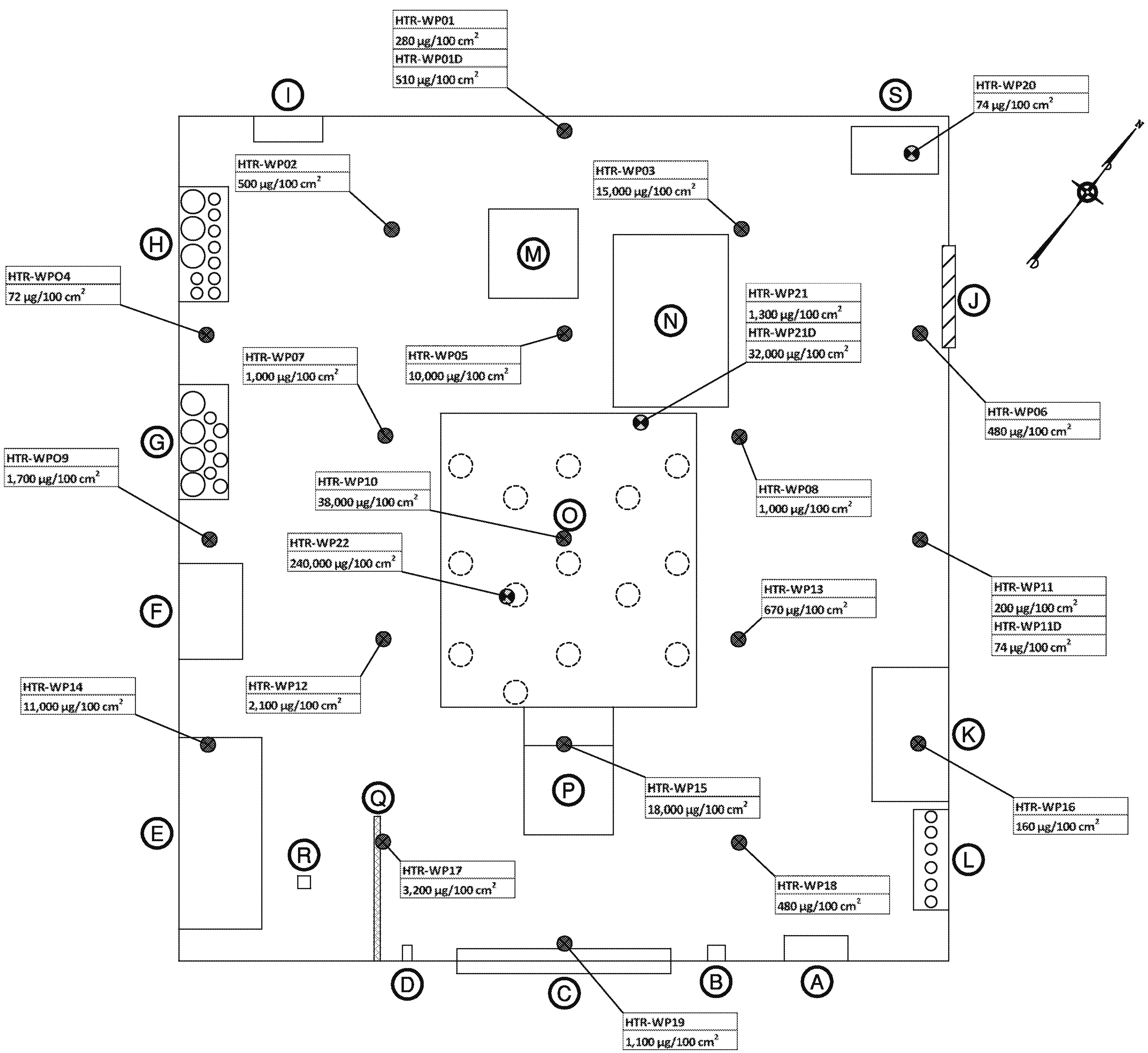
NAVAL COMPUTER & TELECOMMUNICATIONS AREA ATLANTIC DETACHMENT
CUTLER, MAINE

SITE PLAN AND HISTORICAL REMOVAL AREAS

SOUTH HELIX HOUSE TRANSFER ROOM
WORK PLAN, PCB INVESTIGATION AT SOUT HELIX HOUSE TRANSFER ROOM

SCALE	AS NOTED
FILE	I:\..\SHH_SITE_PLAN.MXD
REV	0
DATE	05/31/11
FIGURE NUMBER	2

ACAD:I:\05184\02.01\SHH_TR_WIPE_SAMP.DWG 5/31/13 DWM



Legend

A. Distribution panel
B. Fire alarm
C. Doorway
D. Fire alarm
E. De-ice panel (out of service)
F. PLC control cabinet
G. Communication control panel
H. Communication control panel
I. Distribution panel
J. Louver window
K. Dry transformer
L. Control panel
M. Power panel
N. Dry transformer (pad-mounted)
O. Switching unit (elevated off floor)
P. Oil filled transfer switch
Q. Channel in floor
R. 4-inch (approximate) hole in floor
S. Reported historic location of former switch

Conduit

Support structure and/or conduit

Primary grid wipe sample location

Contingency grid wipe sample location

Note:

1. The following PCB Aroclors were analyzed for: 1016, 1221, 1232, 1242, 1248, 1254, and 1260.
2. Source of analytical results from Final South Helix House, Helix Transfer Room, Polychlorinated Biphenyls, Hazardous Materials Survey Report, Baker, February 2013.

GRAPHIC SCALE

0' 3' 6'

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NAVAL COMPUTER AND TELECOMMUNICATIONS AREA ATLANTIC
DETACHMENT CUTLER
CUTLER, MAINE

WIPE SAMPLE LOCATIONS AND TOTAL PCBs SAMPLE RESULTS - SEPTEMBER 2012

SOUTH HELIX HOUSE TRANSFER ROOM
WORK PLAN, PCB INVESTIGATION AT SOUTH HELIX HOUSE TRANSFER ROOM

FILE	SCALE
I:\..\SHH_TR_WIPE_SAMP.DWG	PER SCALE BAR

FIGURE NUMBER	REV	DATE
3	0	5/31/13

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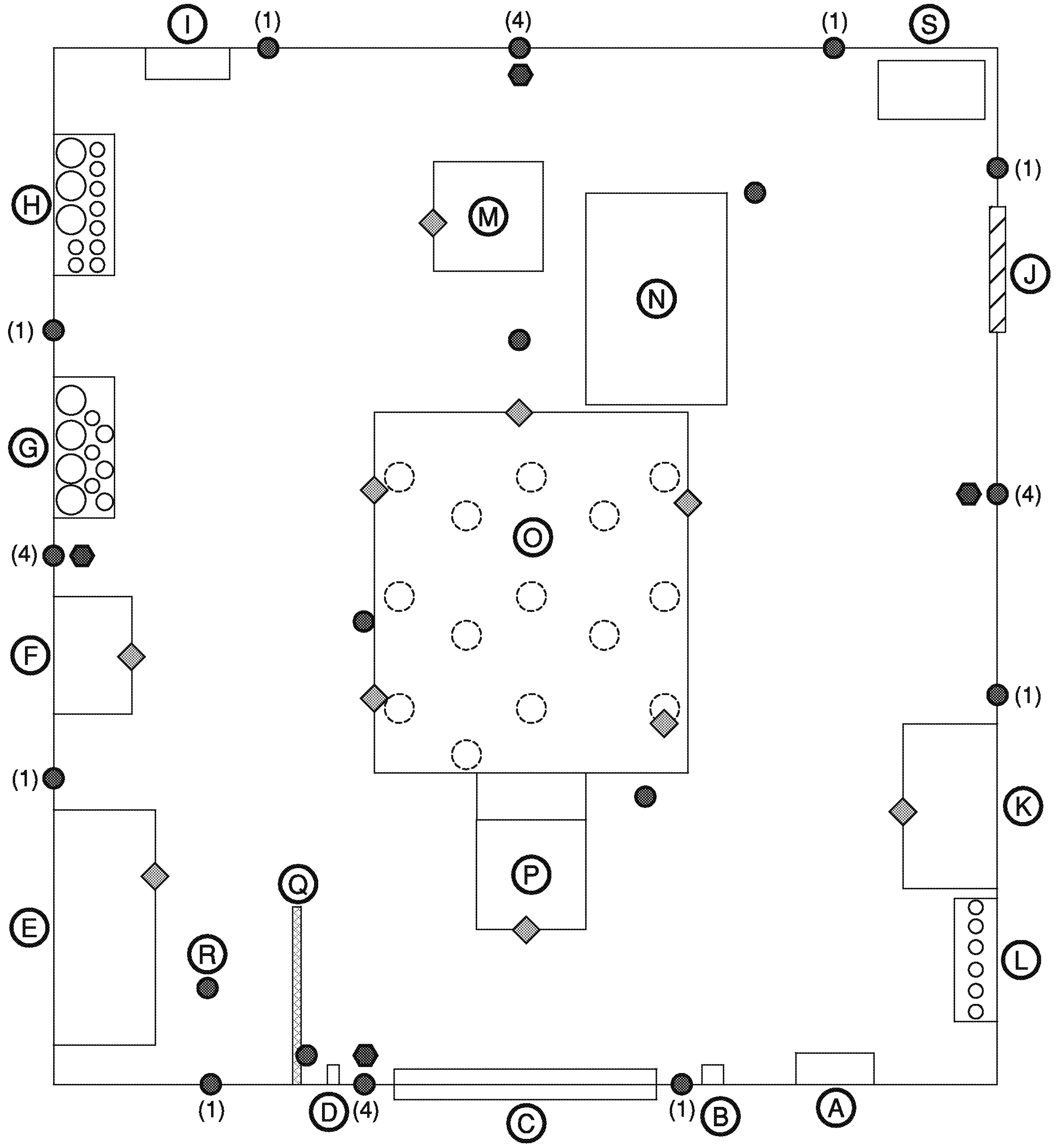


Legend

A. Distribution panel
B. Fire alarm
C. Doorway
D. Fire alarm
E. De-ice panel (out of service)
F. PLC control cabinet
G. Communication control panel
H. Communication control panel
I. Distribution panel
J. Louver window
K. Dry transformer
L. Control panel
M. Power panel
N. Dry transformer (pad-mounted)
O. Switching unit (elevated off floor)
P. Oil filled transfer switch
Q. Channel in floor
R. 4-inch (approximate) hole in floor
S. Reported historic location of former switch

Conduit

Support structure and/or conduit

Proposed equipment wipe sample location

(1) Proposed bulk concrete sample location (number in parenthesis indicates distance (feet) above floor the sample will be collected)

Proposed floor-gap caulking sample location

GRAPHIC SCALE

0' 3' 6'

TriEco A Joint Venture

NAVAL COMPUTER AND TELECOMMUNICATIONS AREA ATLANTIC
DETACHMENT CUTLER
CUTLER, MAINE

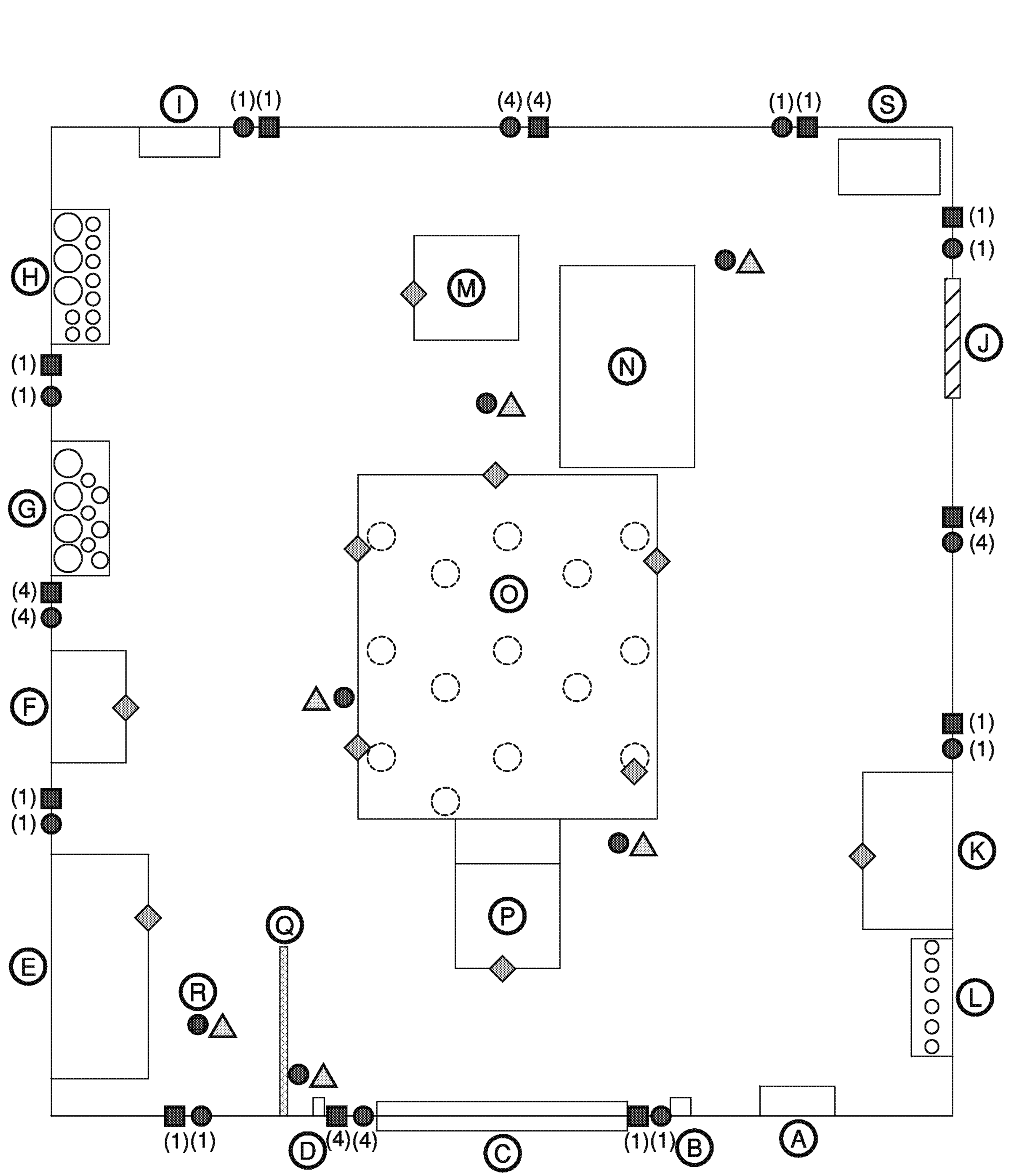
PROPOSED PRE-CLEANING SAMPLE LOCATIONS

SOUTH HELIX HOUSE TRANSFER ROOM
WORK PLAN, PCB INVESTIGATION AT SOUTH HELIX HOUSE TRANSFER ROOM

FILE	SCALE
I:\..\SHH_TR_PROP_SAMP_LOC_PRE.DWG	PER SCALE BAR

FIGURE NUMBER	REV	DATE
4	0	6/3/13

ACAD:I:\05184\02.01\SHH_TR_PROP_SAMP_LOC_POST.DWG 6/3/13 DWM



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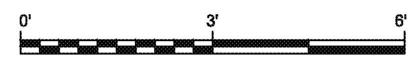
Proposed equipment wipe sample location

(1) Proposed bulk concrete sample location (number in parenthesis indicates distance (feet) above floor the sample will be collected)

(1) Proposed wall wipe sample location (number in parenthesis indicates distance (feet) above floor the sample will be collected)

Proposed floor wipe sample location



TriEco
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NAVAL COMPUTER AND TELECOMMUNICATIONS AREA ATLANTIC
DETACHMENT CUTLER
CUTLER, MAINE

PROPOSED POST-CLEANING SAMPLE LOCATIONS

SOUTH HELIX HOUSE TRANSFER ROOM
WORK PLAN, PCB INVESTIGATION AT SOUTH HELIX HOUSE TRANSFER ROOM

FILE	SCALE
I:\..\SHH_TR_PROP_SAMP_LOC_POST.DWG	PER SCALE BAR

FIGURE NUMBER	REV	DATE
5	0	6/3/13

TABLES

TABLE 1: Key Personnel

Work Plan for PCB Investigation at South Helix House Transfer Room, NCTAMS LANT DET Cutler, Cutler, Maine

Name	Title/Role	Organization	Telephone Number	Address	E-mail Address
Bobbette Abraham	Navy Project Manager (PM)	NAVFAC Mid-Atlantic Facilities Engineering Command	(757) 341-0407	Attn: Code EV12, 9742 Maryland Avenue Building N-26 Room #3208 Norfolk, VA 23511-3095	bobbett.abraham@navy.mil
Lisa Joy	PWD-Maine Environmental Director	PWD-Maine, Environmental Division	(207) 438-4707	Portsmouth Naval Shipyard Building 59, Floor 3 Portsmouth, NH 03804-5000	lisa.joy@navy.mil
Frederick Thyng	PWD-Maine Installation Restoration Coordinator	PWD-Maine, Environmental Division	(207) 438-6618	Portsmouth Naval Shipyard Building 59, Floor 3 Portsmouth, NH 03804-5000	frederick.thyng@navy.mil
Clifford Staggs (Mark)	Cutler Site Environmental Manager	PWD-Maine, Environmental Division	(207) 259-8282	175 Ridge Road Cutler, ME 04626	clifford.staggs@navy.mil
Jim Holmes	N3 - Telecommunications Manager	NCTAMSLANT Det Cutler	(207) 259-8321	175 Ridge Road Cutler, ME 04626	jim.holmes@navy.mil
Steve Emery	PWD-Maine FEAD Construction Safety	PWD-Maine, Facility Engineering Acquisition Division	(207) 438-4081	Portsmouth Naval Shipyard Portsmouth, NH 03804-5000	steven.emery@navy.mil
Yvonne Walker, MSE, MS, CIH	Environmental Programs Department Head	Navy Bureau of Medicine and Surgery, Naval Public Health Center	(757) 953-0941	620 John Paul Jones Circle, Suite 1100 Portsmouth VA 23708-2103	yvonne.walker@med.navy.mil
Pamela Davis Green	Environmental Services Specialist	Maine Department of Environmental Protection Division of Oil and Hazardous Waste Facilities Registration	(207) 287-7880	17 State House Station Augusta, ME 04333-0017	pamela.d.green@maine.gov
James Forrelli, PE	Project Manager (PM)	TriEco-Tt	(978) 474-8412	250 Andover Street, Suite 200 Wilmington, MA 01887	james.forrelli@tetratech.com

Name	Title/Role	Organization	Telephone Number	Address	E-mail Address
Mike Horton	Field Team Lead	TriEco-Tt	(978) 474-8454	250 Andover Street, Suite 200 Wilmington, MA 01887	mike.horton@tetratech.com
Thomas Dickson, CSP	Project Health and Safety Officer	TriEco-Tt	(412) 921-8457	Foster Plaza 7, Suite 5 661 Andersen Drive, Pittsburgh, PA 15220	tom.dickson@tetratech.com
Mike Flory	On-Site Health and Safety Officer and Qualified Electrical Person	TriEco-Tt	(412) 921-8157	Foster Plaza 7, Suite 5 661 Andersen Drive, Pittsburgh, PA 15220	mike.flory@tetratech.com
Joe Samchuck	Data Validation Manager	TriEco-Tt	(412) 921-8510	Foster Plaza 7, Suite 5 661 Andersen Drive, Pittsburgh, PA 15220	joseph.samchuck@tetratech.com
Edward Lawler	Laboratory PM	Spectrum Analytical, RI Division	(401) 732-3400 x315	175 Metro Center Blvd., Warwick, RI 02886	elawler@spectrum-analytical.com

APPENDIX A
SAMPLING AND ANALYSIS PLAN FOR
PCB INVESTIGATION AT SOUTH HELIX TRANSFER ROOM
NCTAMS LANT DET CUTLER
CUTLER, MAINE

Revised Final

Sampling and Analysis Plan for PCB Investigation at South Helix House Transfer Room

NCTAMS LANT DET Cutler
Cutler, Maine

August 2013

Prepared for:
Department of the Navy
Naval Facilities Engineering Command, Mid-Atlantic
Norfolk, Virginia

Prepared by:
TriEco-Tt
1230 Columbia Street, Suite 1000
San Diego, California 92101

Prepared under:
Naval Facilities Engineering Command
Contract Number N62473-11-D-2205
Delivery Order WE01

W5213861RF

Revised Final

Sampling and Analysis Plan
for
PCB Investigation at South Helix House Transfer Room
Cutler, Maine

Contract Number N62473-11-D-2205
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PREPARED FOR:

DEPARTMENT OF THE NAVY
Naval Facilities Engineering Command, Mid-Atlantic
Norfolk, Virginia

REVIEW AND APPROVAL

Project Manager: James R. Forrelli Date: 8/2/13

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ACRONYMS AND ABBREVIATIONS

µg/cm2	Microgram per centimeters squared
CFR	Code of Federal Regulations
CTO	Contract Task Order
DL	Detection Limit
DoD	Department of Defense
ELAP	Environmental Laboratory Accreditation Program
EPA	U.S. Environmental Protection Agency
LANT DET	Atlantic Detachment
LOD	Limit of Detection
LOQ	Laboratory-specific Limit of Quantitation
mg/kg	Milligrams per kilogram
MRSA	Maine Revised Statutes Annotated
N/A	Not Applicable
NAVFAC	Naval Facilities Engineering Command
NCTAMS	Naval Computer and Telecommunications Area Master Station
Navy	Department of the Navy
NLAP	National Lead Accreditation Program
PAL	Project Action Limits
PCBs	polychlorinated biphenyls
ppm	parts per million
QAM	Quality Assurance Manual
QC	Quality control
SAP	Sampling and analysis plan
SHHTR	South Helix House Transfer Room
SOP	Standard Operating Procedure
Spectrum	Spectrum Analytical
TSCA	Toxic Substance Control Act

1.0 INTRODUCTION

TriEco-Tt has been retained by the United States Department of the Navy (Navy), Naval Facilities Engineering Command (NAVFAC) Mid-Atlantic to conduct an investigation and self-implementing remedial action for materials contaminated with polychlorinated biphenyls (PCBs) within South Helix House Transfer Room section of the South Helix House, located at the Naval Computer and Telecommunications Area Master Station (NCTAMS) Atlantic Detachment (LANT DET) Cutler, in Cutler, Maine. This work will be completed by TriEco-Tt under Navy Contract Number N62473-11D-2205, Contract Task Order (CTO) WE01. This Sampling and Analysis Plan (SAP) describes the proposed strategy and rationale for procedures associated with surface wipe and bulk material sampling, as well as quality assurance objectives, analytical quality control, and data quality management. The project background, investigation objectives, and details describing planned site remediation activities are presented in the accompanying Work Plan prepared by TriEco-Tt.

2.0 FIELD SAMPLING RATIONALE AND STRATEGY

Field sampling in the South Helix House Transfer Room will include the collection of both pre-cleaning samples and post-cleaning confirmation samples. Prior to pre-cleaning sampling activities, the Remedial Action subcontractor will remove the temporary floor cover materials, which include plywood and plastic sheeting. After removing these materials and prior to the cleaning/decontamination activities to be performed, pre-cleaning sampling will be conducted to further delineate existing PCB contamination of materials and surfaces. Pre-cleaning PCB samples will include bulk samples of concrete and floor caulking, as well as surface wipe samples. Following the cleaning of surfaces/materials, post-cleaning confirmation sampling and analysis will be conducted to verify that cleanup goals have been achieved. Post-cleaning confirmation samples will include bulk samples of concrete as well as surface wipe samples. Additional details regarding these sampling activities are presented below.

2.1 PRE-CLEANING SAMPLING

Pre-cleaning samples will consist of surface wipe samples from equipment cabinet exteriors, and bulk samples of concrete and floor caulk. Equipment cabinet exterior surface wipe sampling will be conducted prior to bulk sampling. A summary of the proposed pre-cleaning samples for PCB analysis is presented in Table 1, and the proposed sample locations are illustrated on Figure 1.

Pre-cleaning surface wipe sampling will include a total of ten wipe samples for PCB analysis, to be collected from select equipment cabinet exteriors in the South Helix House Transfer Room.

Pre-cleaning bulk sampling in the South Helix House Transfer Room will include the collection of six concrete floor samples, twelve concrete wall samples, and four caulking samples (along the floor-wall gap). Sampling will begin at the location furthest from the room entryway and will progress toward the entryway. In addition, the samples from the floor will be collected prior to the wall samples. Details regarding these bulk sample locations follow:

- Concrete floor samples: Four of the six bulk concrete floor samples will be collected at floor locations where elevated PCBs were identified during initial site characterization efforts conducted in 2012 (Baker, 2012). The remaining two bulk concrete floor samples will be collected at floor locations where a floor drainage channel and floor drainage hole, approximately 4 inches across, were previously observed.

- Concrete wall samples: The twelve bulk concrete wall samples will include three from each of the four walls in the Transfer Room, with two of the three samples to be located approximately 1 foot above the floor, and one sample to be located approximately 4 feet above the floor.

- Caulking samples: Four bulk caulking samples will be collected, one along each of the four floor-wall junctions where gaps are present. The spilled dielectric oil may have potentially collected at these locations.

2.2 POST-CLEANING CONFIRMATION SAMPLING

Following the completion of cleaning/decontamination activities in the South Helix House Transfer Room, confirmation samples will be collected, including surface wipe confirmation samples and bulk (concrete) confirmation samples. Surface wipe samples will be collected prior to bulk samples, and floor samples will be collected prior to wall samples, where possible. Sampling will begin at the location(s) furthest from the room entryway and will progress toward the entryway. A summary of the post-cleaning confirmation samples is presented in Table 1. Proposed post-cleaning and wipe bulk sample locations are illustrated on Figure 2.

Post-cleaning surface wipe samples will consist of a total of 28 confirmation surface wipe samples, including 6 floor surface wipes, 12 wall surface wipes, and 10 equipment surface wipes. The confirmation surface wipe samples from the floor and walls will be collected at locations adjacent to the original, pre-cleaning bulk concrete samples, as discussed above.

The ten confirmation wipe samples for equipment will also be co-located with the ten (10) associated pre-cleaning surface wipe sample locations.

Post-cleaning bulk samples will consist of a total of eighteen (18) confirmation concrete samples, including twelve (12) concrete wall samples and six (6) concrete floor samples. Confirmation sample locations will be adjacent to pre-cleaning bulk sample locations, with floor samples to be collected prior to wall samples.

2.3 WIPE SAMPLING PROCEDURE

Surface wipe samples will be collected in accordance with the *USEPA Polychlorinated Biphenyl Inspection Manual*, dated August 2004. A pre-purchased, cardboard wipe sample template measuring 10-centimeters by 10-centimeters will be placed at each sample location. Samples will be collected using laboratory-provided, 3-inch by 3-inch sterile gauze wetted with pesticide-grade hexane. The wetted gauze will be applied to the wipe template area using moderate hand pressure, and wiped in an up and down motion, moving from left to right, then in a side to side motion, moving from the top to the bottom of the sample area. The gauze will then be placed in the appropriate sample jar and logged onto the laboratory-provided chain-of custody documentation. Nitrile gloves used by TriEco-Tt personnel during sampling efforts will be removed and disposed of between sampling locations to prevent potential sample cross-contamination. The wipe templates will also be disposed of after one use, and collected along with used nitrile gloves for subsequent disposal.

2.4 BULK SAMPLING PROCEDURE

Bulk samples consisting of concrete and caulking will be collected in accordance with the *USEPA Region I Draft Standard Operating Procedure (SOP) for Sampling Porous Surfaces for Polychlorinated Biphenyls*, dated May 5, 2011. Concrete samples will be collected as composites. At each concrete sampling location, an electric-powered hammer drill equipped with a 1/2-inch carbide drill bit will be used to advance five holes to a depth of 1/2-inch. At floor concrete sample locations, a stainless steel scoopula will be used to remove the concrete powder from each of the five discrete sub-sample locations that comprise a single (composite) sample. For wall concrete samples, an aluminum tray will be placed under the drill to collect the pulverized concrete dust from the five sub-sample locations. For each sample, at least 10 grams of pulverized concrete will be placed into a 4-ounce amber jar using a dedicated stainless steel scoopula, and the sample will be homogenized. Adequate sample volume (10 grams, noted above) will be achieved by filling each jar to one-half capacity.

Bulk caulking samples will be collected using a decontaminated stainless steel knife or equivalent. These samples will also be placed in 4-ounce amber jars.

For all bulk sampling, the drill bit, scoopula, aluminum tray, and knife will be decontaminated between each location using procedures described in Section 4.0. (For composite samples, decontamination is not required between the collection of each of the five sub-sample aliquots that comprise each composite sample.) Each drill hole created during the concrete sampling will be repaired using pre-mixed concrete. Locations where caulking samples are collected will be restored to pre-existing conditions using replacement caulking free of PCB.

3.0 SAMPLE HANDLING AND DOCUMENTATION

Each sample collected will be documented on individual sample log sheets. The log sheet will contain the collection date and time, sample location description with a detailed sketch, field measurements and description of surface conditions at the sample location, and any other pertinent observations made during sample collection efforts. In addition, a digital camera will be used to take photographs of each sample location and to document sampling conditions.

Upon collection, samples will be stored on ice in a cooler together with a temperature blank provided by the contracted laboratory. Samples will be accompanied by an appropriate chain-of-custody form and shipped via common courier for next-day-delivery to the analytical laboratory.

Each sample collected for chemical analysis will be assigned a unique sample-tracking number that will be used to manage the results. Each sample-tracking number will consist of alpha-numeric (A-N) characters identifying the site, sample medium and sample number, such as:

AAAAA	-	AA	-	NN
(Site ID)	-	(Sample Medium)	-	(Sample Number)

Site Identifier: "SHHTR" (South Helix House Transfer Room)

Medium Identifier: "WP" for surface wipe samples; "CO" for concrete bulk samples; "CA" for caulking bulk samples.

Sample Number: Sample numbers will be assigned sequentially for each type of sample collected (within each sample medium).

For example, a concrete sample collected from location number 15 will be labeled "SHHTR-CO-15."

4.0 SAMPLING EQUIPMENT DECONTAMINATION

Sampling equipment, including the hammer drill bit, scoopulas, aluminum trays, knives, and any other non-disposable sample equipment coming into contact with samples will be decontaminated initially before use, between sampling locations, and at the completion of sampling activities. Initially, the sampling equipment will be scrubbed in potable water, and then scrubbed in a water solution containing Alconox® detergent. After the initial wash, equipment will be rinsed with analyte-free, reagent-grade water, then rinsed with reagent-grade hexane and rinsed a second time with reagent-grade water. Finally, after the aforementioned decontamination steps, the decontaminated equipment will be allowed to air dry prior to another use. Rinse water and spent hexane will be containerized in a 55-gallon drum for subsequent characterization prior to its transport and disposal off-site by TriEco-Tt's remediation contractor.

5.0 LABORATORY ANALYSIS

Collected samples will be submitted to Spectrum Analytical (Spectrum) in North Kingstown, Rhode Island for PCB analysis by EPA SW-846 Method 3540C/8082, with analytical results provided to TriEco-Tt within 14 calendar days. PCB Aroclors included in the laboratory analysis are Aroclor-1016, 1221, 1232, 1242, 1248, 1254 and 1260. Laboratory-specific Limit of Quantitation (LOQ), Limit of Detection (LOD), Detection Limit (DL), sample container requirements, and sample preservation and holding time requirements are provided in Table 2.

Spectrum is a State-of-Maine-certified environmental laboratory as required by Title 22 Maine Revised Statutes Annotated (MRSA) Chapter 157-A, an accredited U.S. Department of Defense (DOD) Environmental Laboratory Accreditation Program (ELAP) laboratory, and is recognized by the U.S. EPA National Lead Accreditation Program (NLAP). The laboratory will calibrate, maintain, test and inspect the instruments used for analysis in accordance with their laboratory Quality Assurance Manual (QAM) and quality assurance summary included in Appendix A.

6.0 QUALITY CONTROL

The following table summarizes the frequency of collection of Quality Control (QC) samples for the field program specified in this SAP:

Type of QC Sample	Frequency
Field Duplicate	1 per 10 samples for each analysis
Field Blank	1 per 20 samples for each analysis
Laboratory QC	1 per 20 samples for each analysis
Rinsate Blank	1 per 20 samples for each analysis

Field QC sample collection procedures, rationale and sample designation formats are described below:

Field Duplicates will be collected at a frequency of one per ten analytical samples collected, and will be located adjacent to the original sample location (collocated). Results will be used to evaluate the consistency and reproducibility of field sampling and precision of analytical procedures. Duplicate samples will be designated such that the sample number portion of the tracking identifier will be replaced with "DUP" followed by a sequential value and the date (MMDDYY).

Field Blanks will be collected at a frequency of one per twenty analytical samples collected, and will consist of at a location adjacent to the original sample location. Duplicate samples will be designated such that the sample number designation will be replaced with "DUP" followed by a sequential value and the date (MMDDYY).

Laboratory QC samples will be collected at a frequency of one per twenty analytical samples collected. At the location designated for laboratory QC sampling, triple volume will be collected for analysis. Laboratory QC samples will have no separate sample identifier codes, but are noted on the chain-of-custody record and sample log sheet.

Rinsate Blank samples will be collected at a frequency of one per twenty bulk analytical samples collected. Each rinsate sample will be collected by pouring reagent-grade water over the decontaminated drill bit and catching the rinse water in a clean disposable aluminum pan with a clean scoopula present in the pan. The rinse water will then be transferred to the appropriate bottles supplied by the laboratory. Rinsate blank samples will be used to quantify the effectiveness of decontamination procedures employed for the project. Sample identifiers will consist of the site identifier, the "RB" label followed by a sequential value, and the date (MMDDYY). (Example: SHHTR-RB01-070813)

7.0 DATA VALIDATION

The resulting analytical data will undergo limited data validation in accordance with *Region I, EPA-New England Data Validation Functional Guidelines for Evaluating Environmental Analysis,* dated December 1996. Limited data validation will consist of the evaluation of field duplicates, reporting limits, blank contamination, and completeness. Data validation will be performed by an experienced TriEco-Tt environmental chemist.

8.0 REPORTING

The validated analytical data for the post-remediation (confirmation) wipe and bulk samples collected from this investigation will be compared to PCB clean up levels identified in 40 Code of Federal Regulation (CFR) Part 761.125(c)(3) and further described in *Polychlorinated Biphenyl (PCB) Site Revitalization Guidance Under the Toxic Substance Control Act (TSCA),* dated November 2005, prepared by EPA. The revitalization guidance and federal regulations listed above describe self-implementing clean-up levels for various scenarios taking into account the amount of PCB in the original spill, nature of contaminated surface (porous or non-porous) and occupancy level (high or low) of the space were the spill occurred. The spill in the Helix House Transfer Room is classified as a PCB spill of greater than 50 parts per million (ppm), impacting a porous surface. In addition, the guidance document states that a high-occupancy area is defined as a space occupied by individuals not wearing dermal and respiratory protection for more than 335 hours a year or 6.7 hours per week. The Helix House Transfer Room is used to house electrical distribution equipment and is only occupied during routine maintenance; it is classified as a low-occupancy area. The proposed cleanup goals or Project Action Limits (PALs) are 10 micrograms per 100 square centimeters ($\mu g/100\ cm^2$) for wipe samples, and 25 milligrams per kilogram (mg/kg) for bulk samples.

9.0 REFERENCES

Baker, 2013. Final South Helix House, Helix Transfer Room, Polychlorinated Biphenyls Hazardous Materials Survey, NCTAMS LANT DET Cutler, Cutler, Maine, February.

USEPA (United States Environmental Protection Agency), 1996. Region I EPA - New England, Data Validation Functional Guidelines for Evaluating Environmental Analysis. December.

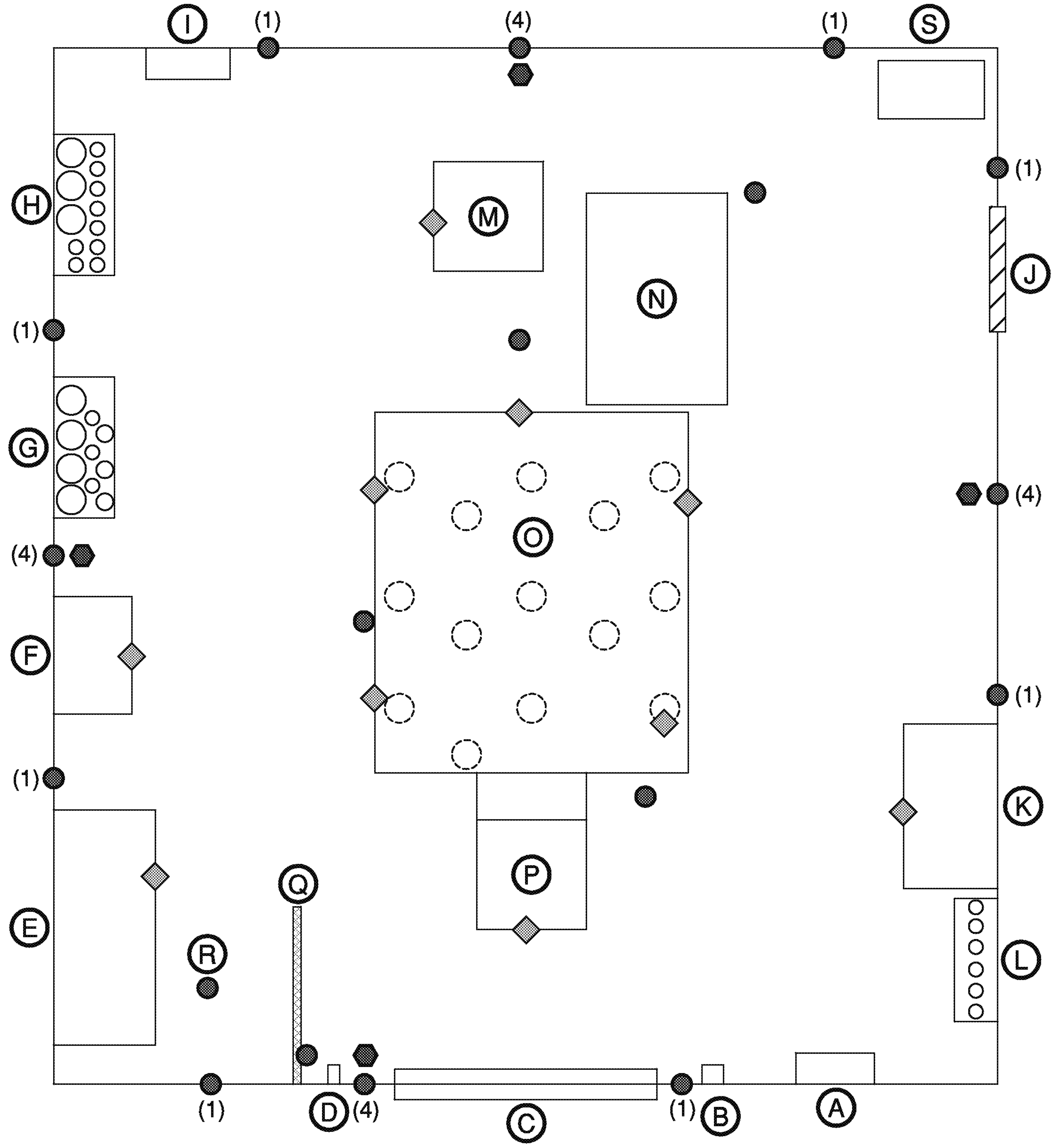
USEPA, 2004. Polychlorinated Biphenyl Inspection Manual, August.

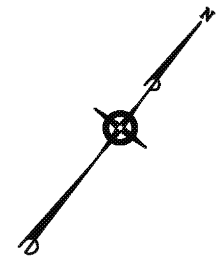
USEPA, 2005. Polychlorinated Biphenyl (PCB) Site Revitalization Guidance Under the Toxic Substance Control Act. November.

USEPA, 2011. Region I Draft Standard Operating Procedure for Sampling Porous Surfaces for Polychlorinated Biphenyls. May 5.

FIGURES

ACAD:I:\05184\02.01\SHH_TR_PROP_SAMP_LOC_PRE_SAP.DWG 6/3/13 DWM





Legend

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Conduit

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Proposed equipment wipe sample location

(1) Proposed bulk concrete sample location (number in parenthesis indicates distance (feet) above floor the sample will be collected)

Proposed floor-gap caulking sample location

GRAPHIC SCALE

0' 3' 6'

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NAVAL COMPUTER AND TELECOMMUNICATIONS AREA ATLANTIC
DETACHMENT CUTLER
CUTLER, MAINE

PROPOSED PRE-CLEANING SAMPLE LOCATIONS

SOUTH HELIX HOUSE TRANSFER ROOM
SAMPLING AND ANALYSIS PLAN

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FIGURE NUMBER 1	REV 0 / DATE 6/3/13

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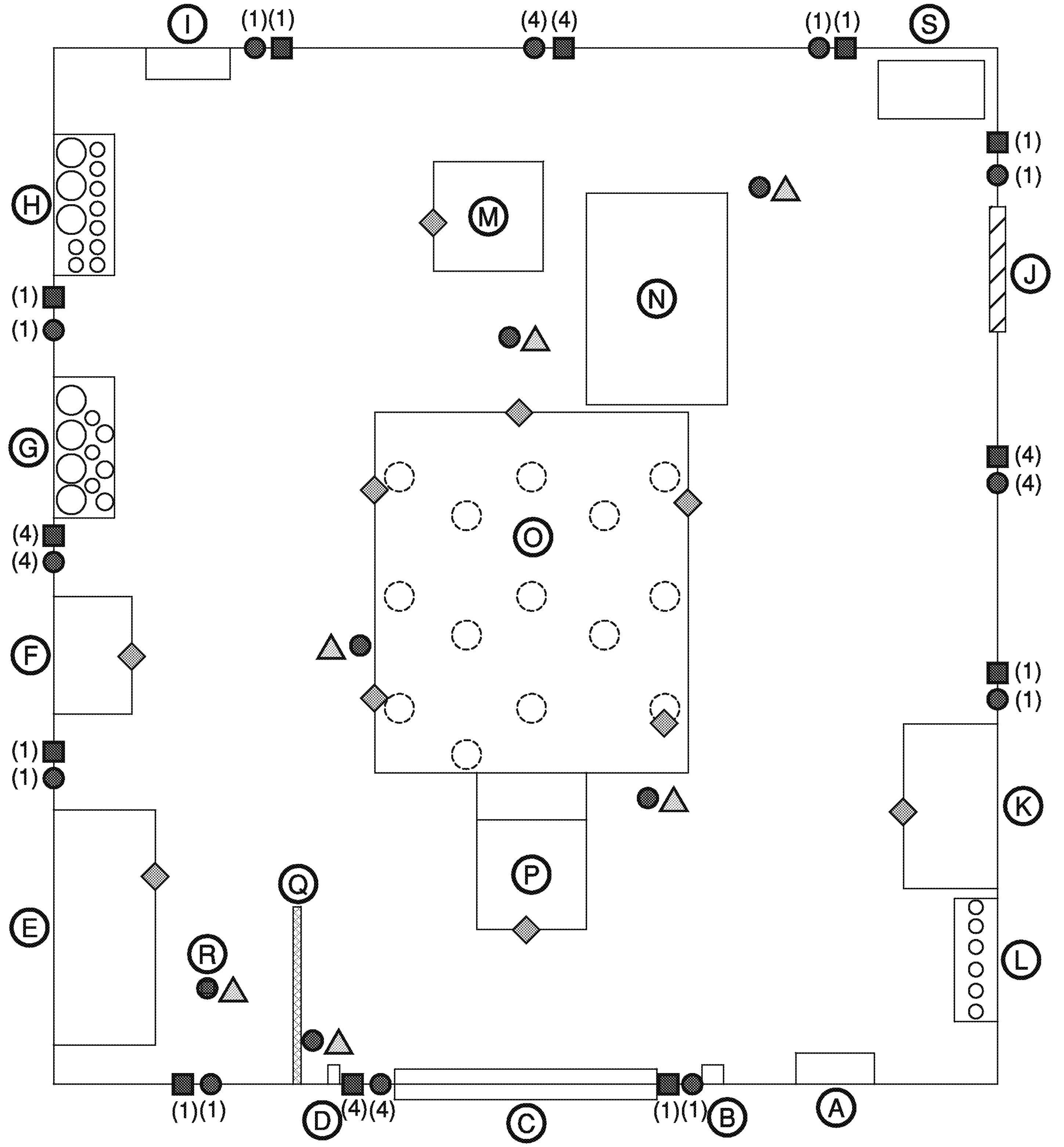

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Support structure and/or conduit

Proposed equipment wipe sample location

(1) Proposed bulk concrete sample location (number in parenthesis indicates distance (feet) above floor the sample will be collected)

(1) Proposed wall wipe sample location (number in parenthesis indicates distance (feet) above floor the sample will be collected)

Proposed floor wipe sample location

GRAPHIC SCALE

0' 3' 6'

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NAVAL COMPUTER AND TELECOMMUNICATIONS AREA ATLANTIC
DETACHMENT CUTLER
CUTLER, MAINE

PROPOSED POST-CLEANING SAMPLE LOCATIONS

SOUTH HELIX HOUSE TRANSFER ROOM
SAMPLING AND ANALYSIS PLAN

FILE	SCALE
I:\..\SHH_TR_PROP_SAMP_LOC_POST_SAP.DWG	PER SCALE BAR

FIGURE NUMBER	REV	DATE
2	0	6/3/13

TABLES

TABLE 1: Sample Summary

Sampling and Analysis Plan for PCB Investigation at South Helix House Transfer Room, NCTAMSLANT DET Cutler, Cutler, Maine

Sample Type	Matrix	Location	Field Samples	Rinsate (Equipment) Blanks[1]	Field Duplicates[2]	Total Field And Field QC	Lab QC[3]
Pre-Cleaning	Concrete	Walls	12	1	2	21	1
		Floor	6				
	Wipe	Equipment	10	N/A	1	11	1
	Caulking	Walls/Floor Gap	4	1	1	6	1
Post-Cleaning	Concrete	Walls	12	1	2	21	1
		Floor	6				
	Wipe	Walls	12	N/A	3	31	3
		Floor	6				
		Equipment	10				

Notes:

1) Collect 1 rinsate blank per 20 field samples for any non-disposable sampling equipment. Rinsate blank is deionized (DI) water run through sample collection equipment after decontamination.
2) Collect 1 duplicate per 10 field samples.
3) Collect 1 Lab QC per 20 samples - Matrix Spike and a Matrix Spike Duplicate. The Lab QC volume is not included in the Field and Field Quality Control Sample total.

N/A – Not applicable

TABLE 2: Laboratory Detection Limits, Sample Container Requirements, Sample Preservation and Holding Times

Sampling and Analysis Plan for PCB Investigation at South Helix House Transfer Room, NCTAMSLANT DET Cutler, Cutler, Maine

Analyte	Limit of Quantitation (LOQ)	Limit of Detection (LOD)	Detection Limit (DL)	Sample Container / Volume Requirements	Sample Preservation	Holding Time
PCB - Bulk Samples (mg/kg)						
Aroclor-1016	0.033	0.0083	0.0025	one – 4-ounce jar /10 grams	6 °C	14 days to extraction, 40 days to analysis
Aroclor-1221	0.033	0.0166	0.0044			
Aroclor-1232	0.033	0.0083	0.0024			
Aroclor-1242	0.033	0.0083	0.0025			
Aroclor-1248	0.033	0.0083	0.0038			
Aroclor-1254	0.033	0.0083	0.0044			
Aroclor-1260	0.033	0.0083	0.0018			
PCBs - Wipe Samples[1] (µg/100 cm^2)	1	1	1	one – 4-ounce jar / one wipe in each jar	6 °C / Hexane	14 days to extraction, 40 days to analysis
PCBs (Aqueous Samples (µg/L)						
Aroclor-1016	1	0.25	0.119	two – 1-liter bottles	6 °C	7 days to extraction, 40 days to analysis
Aroclor-1221	1	0.25	0.095			
Aroclor-1232	1	0.25	0.185			
Aroclor-1242	1	0.25	0.03			
Aroclor-1248	1	0.25	0.063			
Aroclor-1254	1	0.25	0.204			
Aroclor-1260	1	0.25	0.105			

Notes:
1) The LOQ, LOD, and DL is the same for all seven PCB Aroclors.

PCB	polychlorinated biphenyl
°C	degrees Celsius
mg/kg	milligram per kilogram
µg/L	microgram per liter
cm^2	square centimeter

APPENDIX A
SPECTRUM ANALYTICAL, INC. QUALITY ASSURANCE PLAN

SPECTRUM ANALYTICAL, INC.
Featuring
HANIBAL TECHNOLOGY
Rhode Island Division

QUALITY ASSURANCE PLAN
2012

Approved By:

Digitally signed by Hanibal C. Tayeh
Date: 2012.10.09 14:40:39 -04'00'

10/09/2012

Hanibal C. Tayeh, Ph. D.
President, and CEO

Date

10/09/2012

Yihai Ding
Laboratory Director

Date

10/09/2012

Sharyn B. Lawler
Quality Assurance Director

Date

EFFECTIVE DATE: 10/26/2012

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3.0 INTRODUCTION

Spectrum Analytical, Inc. Featuring Hanibal Technology Rhode Island Division (formerly MITKEM and referenced as Spectrum Analytical, Inc. RI Division throughout this document going forward) is an environmental testing laboratory dedicated to providing high quality analytical data and exceptional customer service.

Opened in 1994, as Mitkem Corporation, and purchased by Spectrum Analytical, Inc. in 2007, Spectrum Analytical, Inc. RI Division's laboratory facility is designed for high throughput and efficient laboratory operations. Separate secure areas are dedicated to sample receipt and storage. Spectrum Analytical, Inc. RI Division has individual sample preparation laboratories for organic and inorganic analyses and individual instrumentation rooms for extractable organics, volatiles, metals and wet-chemistry analyses.

Spectrum Analytical, Inc. RI Division recognizes the importance of controlling in-house cross contamination. The organic preparation area and the volatile organic instrument room are in separate areas, at opposite ends of the building to minimize solvent contamination of the volatile analysis. The air handling system in the volatiles laboratory is completely isolated from the remainder of the facility. A floor plan of the facility is included (Figure 3-1).

Spectrum Analytical, Inc. RI Division has placed a priority on obtaining and operating a large fleet of the latest, most sophisticated Hewlett-Packard, Thermo Scientific and Perkin-Elmer instruments. This emphasis on instrumentation enables the lab to operate at a high level of analytical efficiency.

Spectrum Analytical, Inc. RI Division specializes in performing laboratory analyses using the newest US EPA Contract Laboratory Program (CLP) *SOM* Organic and *ISM* Inorganic methods, as well as providing CLP-format data reports for virtually any test we perform. Spectrum Analytical, Inc. RI Division provides CLP-format reporting for EPA CLP, SW-846, MCAWW and Standard Methods analyses. Much of this work is performed by the laboratory under Department of Defense Quality Systems Manual (QSM) and ISO-17025 guidelines. Spectrum Analytical, Inc. RI Division has the flexibility to provide project-specific custom method modifications to meet the needs of a unique client or analytical requirement.

Spectrum Analytical, Inc. RI Division has participated in numerous environmental laboratory programs for both state and federal agencies including: the United States Navy, the United States Army Corps of Engineers, and the Air Force Center for Environmental Excellence. In addition Spectrum Analytical, Inc. RI Division is currently providing laboratory services under the United States Environmental Protection Agency Contract Laboratory Program. Spectrum Analytical, Inc. RI Division has been a contractor to the EPA under the CLP program continuously for over 15 years.

Spectrum Analytical, Inc. RI Division is a division of Spectrum Analytical, Inc. of Agawam, Massachusetts. Spectrum Analytical, Inc is an environmental laboratory company with laboratory locations in Agawam, MA, North Kingstown, Rhode Island and Tampa, Florida, providing analyses of soil, water and air samples for a wide variety of private and government clients.

This Quality Assurance Plan (QAP) describes the policies, organization, objectives, and quality control activities. It also specifies quality assurance functions employed at Spectrum Analytical, Inc. RI Division and demonstrates our dedication to the production of accurate, consistent data of known quality. This QAP is developed by following the guidelines discussed in the EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations, EPA QA/R-5, Reissued May 2006: EPA Requirements for Quality Management Plans, EPA QA/R-2, Reissued May 2006: Department of Defense (DOD QSM) Quality Systems Manual for Environmental Laboratories Version 4.2: and the National Environmental Laboratory Accreditation Conference (NELAC) standards, June 5, 2003 (Effective July 1, 2003)/ The NELAC Institute (TNI) Standards.

Figure 3-1 Floor Plan

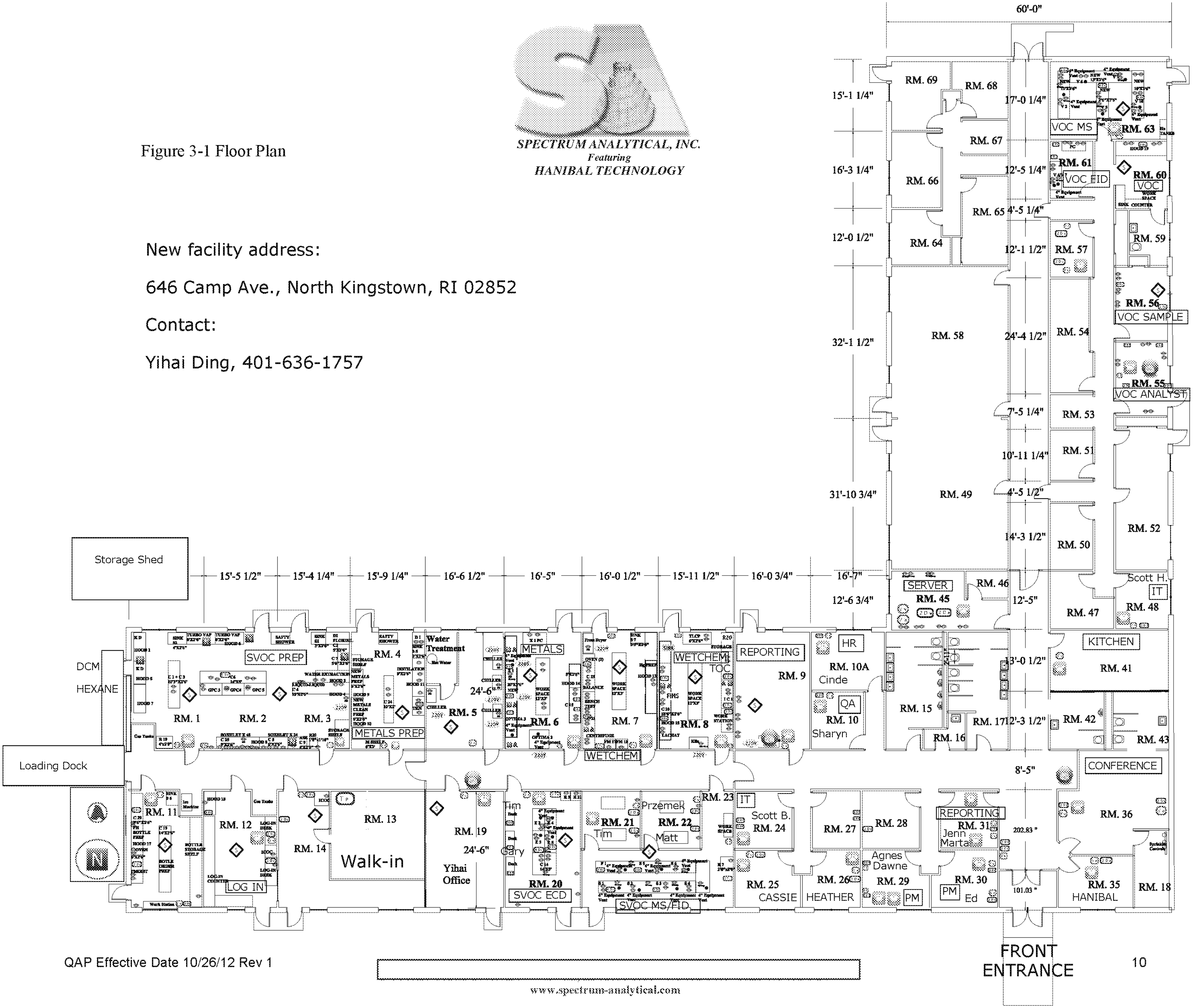
SPECTRUM ANALYTICAL, INC.
Featuring
HANIBAL TECHNOLOGY

New facility address:

646 Camp Ave., North Kingstown, RI 02852

Contact:

Yihai Ding, 401-636-1757



4.0 QUALITY ASSURANCE POLICY STATEMENT

Spectrum Analytical, Inc. RI Division is firmly committed to the production of valid data of known quality through the use of analytical measurements that are accurate, reproducible and complete. To ensure the production of such data, Spectrum Analytical, Inc. RI Division has developed a comprehensive Quality Assurance/Quality Control Program that operates throughout the entire organization.

Spectrum Analytical, Inc. RI Division Management considers Quality Assurance/Quality Control to be of the highest importance in the success of its Analytical Testing Laboratory and therefore fully supports the staff in the implementation and maintenance of a sound and thorough Quality Assurance Program.

Spectrum Analytical, Inc. RI Division's corporate success is based on its participation in the most rigorous and quality-focused environmental testing programs, such as the EPA Contract Laboratory Program, US Department of Defense programs, NELAC, and other nationwide and state-specific certification and approval programs. These programs require consistent application of the QA/QC procedures described in this document. Spectrum Analytical, Inc. RI Division's ability to demonstrate and document that analyses were performed in this manner is one of the foundations of its business. The other foundation of its business is to provide superior levels of customer service, above and beyond the norm for laboratories performing at this level of quality.

Spectrum Analytical, Inc. RI Division's approach to customer service is to aggressively meet or exceed customer expectations, particularly in terms of turnaround time for results. While the production of rapid turnaround time data may require lab employees to "go the extra mile" for the customer, without quality, the data are useless. Spectrum Analytical, Inc. RI Division constantly strives to manage its business to rapidly provide data to meet all the requirements of its quality program.

- Spectrum Analytical, Inc. RI Division management works to insure: that employees understand the primary importance of quality in its day to day operations,
- that employees will not be subjected to pressure to sacrifice quality for turnaround, financial or other considerations,
- that employees understand the importance of their ethical responsibilities in terms of data manipulation, falsification or other illegal or improper actions,
- that the company avoids involvement in activities that diminish its competence, impartiality, judgment or operational integrity.
- that employees maintain all client information in a confidential manner, and
- that employees understand that any short-term gain realized by disregarding the QA/QC program will be more than wasted by the serious penalties for these actions.
- That the laboratory has the technical personnel to identify occurrences of departure from the quality system and to initiate actions to prevent or minimize such departures.

All employees receive training in these issues as part of the initial orientation process, and are required to acknowledge that they understand their responsibilities in these areas. These issues are also discussed among all laboratory staff at company meetings and re-training sessions. The QA Officer, Technical Director and other senior management are readily available to all staff through their daily presence, "open door" policy and approachable manner. This allows any employee to readily discuss any questions, concerns or issues that may occur.

Quality Control is defined as an organized system of activities whose purpose is to demonstrate that quality data are being produced through documentation. Quality Assurance is more broadly defined as a system of activities designed to ensure that the quality control program is actually effective in producing data of the desired quality.

Quality Control is included as part of Quality Assurance. In supporting government regulatory and enforcement proceedings, a high degree of attention to quality is essential. Thorough application of quality control principles and routine quality assurance audits is required.

The basic components of the Spectrum Analytical, Inc. RI Division's QA/QC Program are control, evaluation and correction.

Control ensures the proper functioning of analytical systems through the implementation of an orderly and well-planned series of positive measures taken prior to and during the course of analysis including quality control practices, routine maintenance and calibration of instruments, and frequent validation of standards.

Evaluation involves the assessment of data generated during the control process. For example, precision and accuracy are determined from the results of duplicates and spikes, and other check samples. Long-term evaluation measures include performance and systems audit conducted by regulatory agencies, as well as the lab's quality assurance department.

Correction includes the investigation, diagnosis and resolution of any problems detected in an analytical system. Proper functioning of the system may be restored through method re-evaluation, analysis of additional check samples, trouble-shooting and repair of instrumentation or examination and comparison with historical data. Corrective actions are documented and reviewed to make sure they are implemented.

Certain situations may occur when there are occasional departures or exceptions from documented policies and procedures or standard specifications due to client or project specific protocols, unusual sample matrix, or special non-target analyte or non-routine analyses. Spectrum Analytical, Inc. RI Division's policy is to fully document all such procedures and their associated QC, and notify the client or regulatory agency. If the situation is to continue, a Standard Operating Procedure will be written and implemented.

5.0 QUALITY ASSURANCE MANAGEMENT, ORGANIZATION AND RESPONSIBILITY

Quality Assurance at Spectrum Analytical, Inc. RI Division is a company-wide function that depends on:

(1) cooperative working relationships at all levels within the laboratory and

(2) Multi-level review through all working levels of responsibility.

Responsibilities for QA/QC functions begin with the bench scientist and extend to the chief executive officer.

The primary level of quality assurance resides with the bench scientist. After completion of the documented training program, his/her responsibilities include:

- complying with all aspects of formally approved analytical methods and SOPs,
- carefully documenting each step of the analytical process,
- conscientiously obtaining peer review as required,
- promptly alerting laboratory supervisors and/or QA staff members to problems or anomalies that may adversely impact data quality, and
- participation in corrective actions as directed by the laboratory supervisor or QA Director.

The Manager of each laboratory department is responsible for ensuring thorough oversight of the quality of the data generated by the department supervisors, technicians and/or analysts. The Department Manager implements and monitors the specific QC protocols and QA programs with the laboratory to ensure a continuous flow of data meeting all control protocols and Spectrum Analytical, Inc. RI Division QA requirements. The Department Manager's responsibilities include providing the technicians and/or analysts with adequate resources to achieve the desired quality of performance.

The Spectrum Analytical, Inc. RI Division organizational structure is shown in the Organization Chart (Figure 5-1).

Spectrum Analytical, Inc. RI Division's lines of communication flow upward on the Organizational Chart. The open door policy allows all employees' access to anyone on the organization chart. If an employee has an issue with his/her immediate supervisor, he or she may, at any time, speak with someone in management higher up in the Organizational Chart.

Implementation of the entire Quality Assurance Program is the responsibility of the QA Director. While interacting on a daily basis with laboratory staff members, the QA Director remains independent of the laboratories and reports directly to the Laboratory

Director. The QA Director evaluates laboratory compliance with respect to the QA program through informal and formal systems and performance audits as described in Section 13. Remedial action, to alleviate any detected problems, is suggested and/or discussed with the appropriate parties and implemented when necessary.

With input from the appropriate staff members, the QA Director writes, edits and archives QA Plans, QC protocols, and Standard Operating Procedures (SOPs) in accordance with US EPA approved methodologies, and GLP procedures. If site-specific or project-specific QA Plans and/or QC protocols are required, these will be generated as needed.

An essential element of the QA program is record keeping and archiving all information pertaining to quality assurance including QA/QC data, pre-award check sample results, performance test sample results, scores, and follow-up; state certifications of the laboratory; external and internal audits with resolution of EPA and other audit team comments, recommendations and reports. The QA Director also plays an important role in the corrective action mechanism described in Section 16.

In addition, the QA Director works with laboratory staff and management to continuously upgrade procedures and systems to improve the laboratory's efficiency and data quality.

Ultimately, the success of the QA program depends on the cooperation and support of the entire organization. Spectrum Analytical, Inc. RI Division's most valuable resource is its staff of dedicated professionals who take personal pride in the quality of their performance.

Laboratory management works to ensure the competence of all who operate equipment, perform tests and calibrations, evaluate data and sign reports. When employees are in training, appropriate supervision will be provided until the employee has demonstrated the appropriate level of understanding, training, and skill.

Spectrum Analytical, Inc. RI Division's personnel job descriptions:

Responsibilities of each staff area in the laboratory include:

Technician / Preparation Laboratory Areas:

- Analysis of samples through compliance with all aspects of formally approved analytical methods and laboratory SOPs.
- Carefully documenting each step of the analytical process.
- Noting in the appropriate logbook area any unusual occurrences or sample matrix problems.
- Conscientiously obtaining peer review as required.

- Promptly alerting laboratory supervisor, Department Managers and/or QA staff members to problems or anomalies that may adversely impact data quality.
- Routine housekeeping duties for their laboratory area.

Analyst / Instrument Laboratory Areas:

- Analysis of samples through compliance with all aspects of formally approved analytical methods and laboratory SOPs.
- Routine maintenance of instrumentation.
- Preparation of analytical standards and spiking solutions which are documented and traceable to their original source.
- Carefully documenting each step of the analytical process.
- Noting in the appropriate logbook area any unusual occurrences or sample matrix problems.
- Conscientiously obtaining peer and Department Manager review as required.
- Promptly alerting the appropriate Department Manager and/or QA staff members to problems or anomalies that may adversely impact data quality.
- Documenting the initial review of analysis data to determine compliance with established company QA/QC protocols and any project-specific QA criteria, and noting any unusual occurrences or discrepancies on the data review checklist.
- Routine housekeeping duties for their laboratory area.

Data Reporting Specialists:

- Assemble CLP-format data reports by organizing data report forms and raw data in proper order to allow for technical data review.
- Enter data into LIMS or other data reporting computer programs, and print report forms as appropriate.
- Provide non-technical typographical review of data entered into computer systems by other individuals.
- Deliver data reports to customers by FAX or electronic mail.
- Paginate, photocopy, scan, save to CD (bookmark if required) and archive copies of customer reports or other documentation to be retained by the laboratory, or prepare paperless reports.
- Ship, or organize for courier delivery, final data reports to customers.
- Assist the QA Director in management of the document control system.
- Assist Project Managers with bottle order requests and shipment of coolers.
- Assist Project Managers in other tasks as required.

Laboratory Department Manager/Supervisors:

- Oversight of supervisors (where applicable), technicians and/or analysts in their laboratory areas.

- Monitors the status of all work in their laboratory area to insure compliance with holding time and turnaround time requirements.
- Training new scientists in the appropriate procedures and methods in the laboratory.
- Works with Laboratory Director and the QA staff to review, revise and implement SOPs.
- Insures adequate resources to perform the needed tasks by working with administrative personnel to order needed supplies.
- Insures all supplies and reagents meet the QC requirements of their intended task prior to their use in the laboratory.
- Insures all staff are using proper safety protocols.
- Works with Laboratory Director on the annual review of personnel performance.
- Interviews prospective new employees to insure they have the minimal level of qualifications, experience, education and skills necessary to perform their tasks, as well as the appropriate work ethic and social skills necessary for proper teamwork and productivity.
- Review of analytical data to insure compliance with method/SOP requirements prior to release to the client.
- Documents any non-compliance or other unusual occurrences noted during sample analysis and data review such that these can be included in the report narrative and explained to the client.

Data Reviewer:

- Review of analytical data to insure compliance with method/SOP requirements prior to release to the client.
- Generates paperless CLP and CLP-like data packages.
- Documents any non-compliance or other unusual occurrences noted during sample analysis and data review such that these can be included in the report narrative and explained to the client.
- Compiles narrative.
- Assist Laboratory Director, Supervisors and Department Managers in other tasks as required.

Laboratory Director:

- Works with Department Managers to coordinate laboratory areas in the completion of analytical projects.
- Review of analytical data to insure compliance with method/SOP requirements prior to release to the client.
- Works with QA Director to implement new SOPs and to annually review and revise existing SOPs.
- Works with the QA Director, Department Managers and Supervisors to develop and implement corrective action when needed.

- Works with management and supervisory staff to continuously improve the quality and efficiency of all company procedures.
- Assists Department Managers in the annual review of personnel performance.
- Supervises all Management, QA and Supervisory staff to insure compliance with company QA policies and other company procedures.
- Provides technical assistance to all areas of the laboratory staff.
- Acts as technical consultant for chemistry related issues that arise in the lab.
- Provides assistance with instrument optimization or performance issues as needed.
- Offers input on the purchase and operation of new instrumentation.
- Trains other analysts in procedures and methodologies.

Director of Business Development

- Pursues new contracts/projects as well as clients.
- Works with Spectrum Marketing to prepare Bids.
- Ensures laboratory is aware of specific requirements of new projects/contracts.
- Works with clients to insure all questions and concerns are addressed and answered.
- Works with clients to insure their understanding of complex technical issues.
- Works with Quality Services Department staff to continuously improve the quality and efficiency of all company procedures.

Data Reporting Supervisor:

- Works with Laboratory Director, Department Managers and Supervisors to prioritize and coordinate laboratory areas in the timely completion of analytical projects.
- Review of analytical data to insure compliance with method/SOP requirements prior to release to the client.
- Writes project report narratives to document any unusual occurrences noted during sample analysis.
- Works with management and supervisory staff to continuously improve the quality and efficiency of all company procedures.
- Works with Laboratory Director on the annual review of personnel performance.

Project Manager:

- Works with the client to completely understand the requirements of all incoming work.
- Evaluates the client's requirements as compared to the abilities of the laboratory as stated in Standard Operating Procedure (SOP) #110.0023 Project Management.
- Works with the Data Reporting staff to continuously improve the quality and efficiency of all company procedures.

- Communicates the customer's requirements to all laboratory staff working on the project.
- Works with the customer to determine the number and type of sample containers required for the project.
- Works with the Sample Custodian to resolve and communicate to the client any problem or discrepancies with incoming samples.
- Maintains open, responsive and continuous communication with the customer.
- Follows up with the client to assess level of satisfaction, and insure all project goals have been accomplished.
- Assist Business Development and Marketing Staff in other tasks as required.

Information Technology Director:

- Oversees the operations of the three divisions of Spectrum Analytical, Inc. (MA, FL and RI). The IT Director's role is technical guidance, IT long term planning, coordination/communication between the divisions, oversees and makes the necessary decision to support the overall IT function.

Information Technology Manager:

Primary function is to oversee the operations of the Spectrum Analytical, Inc. RI Division's IT department.

- Oversee the operations of the network, including servers and workstations.
- Plan for hardware and software updates
  1) Support users IT needs.
  2) Support client IT needs.
  3) Oversee security of network
- Development and expansion of LIMS.
  1) Program new functionality into LIMS including program based protocols requirements
  2) hard copy reports
  3) electronic reports
  4) processing of data to web site
  5) tracking of data
  6) maintenance of LIMS
  7) security of LIMS
- Generate and troubleshoot more complex EDDs
- Provide backup for the Information Technology Specialist when out and support when it is needed.

Secondary function is to work with the other divisions to try and make transfer of information as seamless as possible. Lend technical support to other divisions and help to bring technical help from other divisions to Spectrum Analytical, Inc. RI Division IT department.

Information Technology Specialist:

- Primary duty is to generate and review EDDs using EDD module.
  a) Generate and validate EDDs using EDD specific tools (CRA, Tetra Tech, CH2M Hill, etc…).
  b) Generate all SEDD files for the EPA SOM contract, and work with the chemists to resolve any defects, if possible.
- Perform server room duties.
  a) Monitor the servers and troubleshoot (if needed)
  b) Perform backup/archive of data on servers
  c) File grooming at the end of the month
  d) Monitor event logs of the servers for issues.
  e) Monitor status of centralized anti-viral program (AVG). Includes monitoring AVG status of workstations
  f) Monitor centralized Windows System Update Server (WSUS). Includes monitoring WSUS status of workstations.
- Handles user issues with printer/scanner/copier systems from Ikon. Based on evaluation, schedule service calls or replaces consumable parts.

Quality Assurance Director:

- Implements the entire QA program.
- Interacts on a daily basis with laboratory staff.
- Evaluates compliance with the QA program through formal and informal reviews of data and processes.
- Implements the corrective action system.
- Maintains a master list of all SOPs and monitors review schedules.
- Works with Department Managers and Supervisors to implement new SOPs and to annually review and revise existing SOPs.
- Controls all master and controlled-copies of SOPs and QAP as per SOP #80.0012; Production of Standard Operating Procedures.
- Posts to intranet, and archives all old and edited revisions of SOPs and QA manual as per SOP# 80.0012; Production of Standard Operating Procedures.
- Interfaces with certification authorities and agencies to maintain existing certifications and programs, and obtain new certifications.
- Maintains records of employee training and certification as per SOP# 80.0016; Training Procedures and Tracking.
- Instructs laboratory personnel on ethics in the workplace.
- Oversees analytical trends that need to be evaluated and corrected.
- Oversees the implementation of MDLs and control limit studies.
- Directs the internal audit program as per SOP# 80.0006; Internal Audits.
- Coordinates all external audit corrective action reports and investigations.
- Maintains certification of NIST thermometers and weights.

- Schedules annual hood inspections and balance calibrations.

In Spectrum Analytical, Inc. RI Division's organizational structure, the Laboratory Director has the ultimate authority for all chemistry-related aspects of the company.

The QA Director reports directly to the Laboratory Director. She has the authority within the management system to bring any issue to the highest levels of the company management and ownership, as well as to halt the release of data she believes to be questionable or suspend the performance of an analysis she believes to be unreliable.

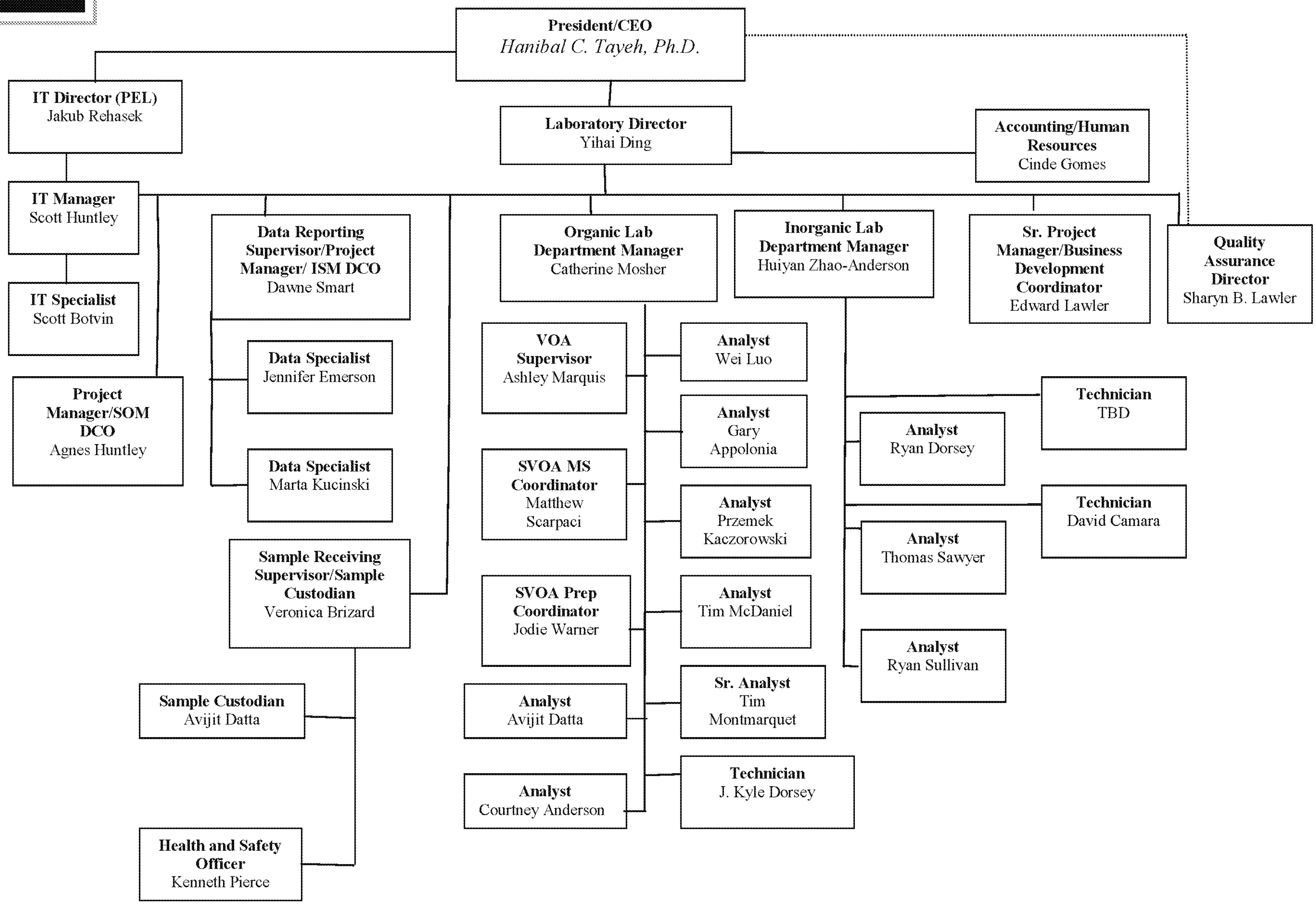
The Director of Business Development works with the project managers and marketing staff and with the Department Managers and Supervisors to prioritize and coordinate work within the laboratories.

The personnel training records are located in the QA department on-site as well as additional training documents being saved in pdf form on the Spectrum network. All individual training is documented including new employee training, individual training, annual retraining procedures, and Health and Safety training.

Figure 5-1
SPECTRUM ANALYTICAL, INC. RI Division's Organizational Chart

Spectrum
Analytical RI

Organizational Chart



6.0 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT DATA IN TERMS OF PRECISION, ACCURACY, REPRESENTATION, COMPLETENESS AND COMPARABILITY AND QA REPORTING

As part of the evaluation component of the overall QA Program, laboratory results are compared with the data quality indicators defined as follows:

- Precision: the agreement of reproducibility among individual measurements of the same property usually made under identical conditions.
- Accuracy: the degree of agreement of a measurement with the true or accepted value.
- Representation: the degree to which data accurately and precisely represent a characteristic of a population, parameter variations of a sample of a finite process condition, or of a finite environmental condition.
- Completeness: a measure of the amount of valid data obtained from a measurement system compared with the amount that was expected to be obtained under normal conditions.
- Comparability: an expression of the confidence with which one laboratory data set can be compared with another laboratory data set in regard to the same property and laboratory sample population.

Quality Assurance objectives may vary by project and requested parameters. The accuracy, precision, and representation of data will be functions of the origins of the sample material, the procedures used to analyze sample and generate data, and the specific sample matrices involved in each project. Quality control practices utilized in the evaluation of these data quality indicators include blanks, replicates, spikes, standards, check samples, calibrations and surrogates. The process for quantifying or assessing the above indicators for data quality is addressed in Section 15.

6.1 Precision and Accuracy:

For each parameter analyzed, the QA objectives for precision and accuracy will be determined from:

- Published historical data;
- Method validation studies;
- Spectrum Analytical, Inc. RI Division's experience with similar samples and/or;
- Project-specific requirements, such as those stipulated by the USEPA in the CLP protocols and control documents.

6.2 Representation:

Analytical data should represent the sample analyzed regardless of the heterogeneity of the original sample matrix. In most cases, representation is achieved by mixing the laboratory sample well before removing a portion for analysis. On occasion, multi-phase laboratory samples may require that each phase be analyzed individually and reported in relation to its proportion in the whole sample.

6.3 Completeness:

The completeness goal is 100% in all cases and includes:

- Analysis of all samples;
- Generation and analysis of all required QC samples;
- Sufficient documentation of associated calibration, tuning and standardization;
- Records of data reduction processes, including manual calculations.

While the laboratory staff is responsible for achieving the completeness objective stated above, assigning each project a specific project manager whose functions include sample management and tracking ensures completeness.

6.4 Comparability:

To assure comparability, Spectrum Analytical, Inc. RI Division employs established and approved analytical methods (e.g. USEPA protocols), consistent analytical bases (dry weight, volume, etc.) and consistent reporting units (mg/Kg, µg/L, etc.). Where data from different samples must be comparable, the same sample preparation and analysis protocols are used for all of the samples of interest.

6.5 QA Reporting

General QA procedures require that an MS/MSD or DUPLICATE/MS be reported with each sample batch up to 20 samples. In addition, each batch requires a method blank (MB) and laboratory control sample (LCS).

An acceptance criterion for the MB depends upon the method criteria. In-house control limits dictate the acceptability of the LCS in many methods. Several methods have set LCS control limits. A high bias LCS is considered acceptable if the analyte is not present in the samples above the reporting limit. A low bias LCS will require re-extraction (if sample volume allows) and re-analysis.

DUP, MS, and MSD recoveries and calculated RPDs are specified in the analytical methods. Recoveries outside the limits require some form of corrective action, whether that includes a post-digestion/distillation spike, re-extraction, re-analysis and/or notification to the client in the project narrative.

LIMS will flag any QA samples outside method criteria on the reporting forms. Formal written corrective action reports are required for any incident that does not meet method criteria and cannot be remedied or explained by the laboratory. The QA Officer signs off on any corrective actions and can also track QA trends in this manner.

7.0 SAMPLING PROCEDURES

For most projects, outside sampling teams deliver or send samples to Spectrum Analytical, Inc. RI Division's. When sampling by Spectrum Analytical, Inc. RI Division's personnel is required, the sampling team follows the sampling procedures outlined in the EPA *Test Methods for Evaluating Solid Wastes*, SW-846, 3rd Edition, or procedures found in the EPA "Handbook for Sampling and Sample Preservation of Water and Wastewater".

Appropriately prepared sample containers are supplied by Spectrum Analytical Inc., RI Division at clients' request. When required, preservatives are added to the sample containers. Tables 7-1 through 7-3 provide the Spectrum Analytical, Inc. RI Division Recommended Container, Preservation Techniques and Holding Times. Additional sample volumes may be required if additional QC functions are to be performed.

Holding times for SW846, CLP Methods, Standard Methods and certain USEPA methods are different and are presented in Tables 7-1 to 7-3. Holding times for most methods are calculated from the date of sample collection. Holding times for CLP methods are calculated from the Validated Time of Sample Receipt (VTSR). It should be noted that the CLP analysis program combines chemical analyses and contract compliance procedures in one document. For laboratory analysis and contract compliance purposes, holding times are calculated from VTSR, while post-analysis data usability and validation (generally performed by the client or a third party) compares holding times to the SW-846 method holding times calculated from date of sample collection.

Representative portions of samples are taken for analysis by following Spectrum Analytical, Inc. RI Division's SOP 110.0039 Standard Operating Procedure for Sub-Sampling.

Table 7-1

Recommended Container, Preservation Techniques and Holding Times
For
SW-846 Analyses

Analytes	Method	Containers	Required* Volume	Preservation	Holding Times
Volatile Organics					
Solid	8260, 5030	Amber glass jar with Teflon lining	Minimal head-space in jar	4°C	14 days
Solid [a]	8260, 5035	40mL vial or Encore with Teflon lining	5.0gram ± 0.5	4°C, unpreserved	48 hours
				DI Water -10 to –20^{0}C	14 days
				Sodium bisulfate -10 to –20^{0}C, 4^{0}C	14 days
				Methanol 4^{0}C	14 days
Aqueous	8260, 5030	40mL VOA Vials with Teflon septum	40mL	4°C HCl, pH<2	14 days
Semivolatile Organics					
Solid	3540, 3550 8270	Amber glass jar with Teflon lining	30gram	4°C	Extraction within 14 days Analysis within 40 days
Aqueous	3510, 3520 8270	Amber glass bottles with Teflon lining	1L	4°C	Extraction within 7 days Analysis within 40 days
Polychlorinated Biphenyls					
Solid	3540, 3550 8082	Amber glass jar with Teflon lining	30gram	4°C	Extraction within 14 days Analysis within 40 days
Aqueous	3510, 3520 8082	Amber glass bottle with Teflon lining	1L	4°C	Extraction within 7 days Analysis within 40 days
Organochlorine Pesticides					
Solid	3540, 3550 8081	Amber glass jar with Teflon lining	30gram	4°C	Extraction within 14 days Analysis within 40 days
Aqueous	3510, 3520 8081	Amber glass bottle with Teflon lining	1L	4°C	Extraction within 7 days Analysis within 40 days
Chlorinated Herbicides					
Solid	8151	Amber glass jar with Teflon lining	30gram	4°C	Extraction within 14 days Analysis within 40 days
Aqueous	8151	Amber glass bottle with Teflon lining	1L	4°C	Extraction within 7 days Analysis within 40 days

Table 7-1 (cont'd)

Recommended Containers, Preservation Techniques and Holding Times
For
SW846 Analyses

Analytes	Method	Containers	Required* Volume	Preservation	Holding Times
Total Petroleum Hydrocarbons					
Gasoline Range Organics, including Maine-GRO**					
Solid	8015, 5030 ME 4.1.17	Amber glass jar With Teflon lining	Minimal head-space in jar	4°C	14 days
Solid [a]	8015, 5035	40mL vial or Encore with Teflon lining	5.0gram ± 0.5	4°C, unpreserved	48 hours
				4°C, Methanol	14days
Aqueous	8015, 5030 ME 4.1.17	40mL VOA vials With Teflon septum	40mL	4°C HCl, pH<2	14 days
Diesel Range Organics, including Maine-DRO					
Solid	3540, 3550 8015 ME 4.1.25	Amber glass jar with Teflon lining	30gram	4°C	Extraction within 14 days Analysis within 40 days
Aqueous	3510, 3520 8015 ME 4.1.25	Amber glass bottle with Teflon lining	1L	4°C H_2SO_4, pH<2	Extraction within 7 days Analysis within 40 days
Total Metals except Mercury and Chromium (VI)					
Solid	3050 6010	Amber glass jar with Teflon lining	10g	4°C	180 days
Aqueous	3005, 3010	Polyethylene bottle	100mL	HNO_3, pH<2	180 days
Chromium (VI)					
Solid	3060, 7196	Amber glass jar with Teflon lining	10g	4°C	Digestion within 30 days Analysis within 96 hours
Aqueous	7196	Polyethylene bottle	25mL	4°C	24 hours
Mercury					
Solid	7471	Amber glass jar	10g	4°C	28 days
Aqueous	7470	Polyethylene bottle	100mL	4°C HNO_3, pH<2	28 days
Cyanide					
Solid	9012	Amber glass jar with Teflon lining	10g	4°C	14 days
Aqueous	9012	Polyethylene bottle	50mL	4°C NaOH, pH≥12	14 days
Flashpoint					
Aqueous	1010	Amber glass bottle	30mL	4°C	28 days

Table 7-1 (cont'd)

Recommended Containers, Preservation Techniques and Holding Times
For
SW846 Analyses

Analytes	Method	Containers	Required* Volume	Preservation	Holding Times
Chloride					
Aqueous	9056	Polyethylene bottle	50mL	4°C	28 days
Nitrate					
Aqueous	9056	Polyethylene bottle	50mL	4°C	48 hours
Nitrite					
Aqueous	9056	Polyethylene bottle	50mL	4°C	48 hours
Orthophosphate					
Aqueous	9056	Polyethylene bottle	50mL	4°C	48 hours
Sulfates					
Aqueous	9056	Polyethylene bottle	50mL	4°C	28 days

Table 7-2

Recommended Container, Preservation Techniques and Holding Times For CLP/ASP Analyses

Analytes	Method	Containers	Required* Volume	Preservation	Holding Times
Volatile Organics					
Solid	CLP/ASP	Amber glass jar with Teflon lining	Minimal head-space in jar	4°C	10 days from VTSR
Aqueous	CLP/ASP	40mL VOA vials with Teflon septum	40mL	4°C HCl, pH<2	10 days from VTSR
	CLP Low	40mL VOA vials with Teflon septum	40mL	4°C HCl, pH<2	10 days from VTSR
Semivolatile Organics					
Solid	CLP/ASP	Amber glass jar with Teflon lining	30gram	4°C	10 days from VTSR Analysis within 40 days
Aqueous	CLP/ASP	Amber glass bottle with Teflon lining	1L	4°C	5 days from VTSR Analysis within 40 days
	CLP Low	Amber glass bottle with Teflon lining	1L	4°C	5 days from VTSR Analysis within 40 days
Organochlorine Pesticide/PCB					
Solid	CLP/ASP	Amber glass jar with Teflon lining	30gram	4°C	10 days from VTSR Analysis with 40 days
Aqueous	CLP/ASP	Amber glass bottle with Teflon lining	1L	4°C	5 days from VTSR Analysis within 40 days
	CLP Low	Amber glass bottle with Teflon lining	1L	4°C	5 days from VTSR Analysis within 40 days
Cyanide					
Solid	CLP/ASP	Amber glass jar	10gram	4°C	12 days from VTSR
Aqueous	CLP/ASP	Polyethylene bottle	50mL	4°C NaOH, pH>12	12 days from VTSR
Total Metals except Mercury					
Solid	CLP/ASP	Amber glass jar	10gram	4°C	180 days from VTSR
Aqueous	CLP/ASP	Polyethylene bottle	100mL HNO_3, pH<2	4°C	180 days from VTSR

Table 7-2 (cont'd)

Recommended Container, Preservation Techniques and Holding Times
For
CLP/ASP Analyses

Analytes	Method	Containers	Required* Volume	Preservation	Holding Times
Mercury					
Solid	CLP/ASP	Amber glass jar	10gram	4°C	26 days from VTSR
Aqueous	CLP/ASP	Polyethylene bottle	100mL	4°C HNO_3, pH<2	26 days from VTSR

Table 7-3

Recommended Containers, Preservation Techniques and Holding Times for Other Analyses

Analytes	Method	Containers	Required* Volume	Preservation	Holding Times
Volatile Organics					
Aqueous	624	40mL VOA vials with Teflon septum	40mL	4°C HCl, pH<2	14 days
Semivolatile Organics					
Aqueous	3510, 3520 625	Amber glass bottle with Teflon lining	1L	4°C	Extraction within 7 days Analysis within 40 days
Organochlorine Pesticide/PCB					
Aqueous	3510, 3520 608	Amber glass bottle with Teflon lining	1L	4°C	Extraction within 7 days Analysis within 40 days
EDB/DBCP					
Aqueous	8011	40mL VOA vials with Teflon septum	35mL	4°C HCl, pH<2	28 days
MA Extractable Petroleum Hydrocarbons (EPH)					
Solid	3540, 3550 MADEP	Amber glass jar with Teflon lining	10gram	4°C	Extraction within 7 days Analysis within 40 days
Aqueous	3510, 3520 MADEP	Amber glass bottle with Teflon lining	1L	4°C HCl, pH<2	Extraction within 14 days Analysis within 40 days
MA Volatile Petroleum Hydrocarbons (VPH)					
Solid	MADEP	Amber glass jar with Teflon lining	10gram	4°C 10mL Methanol	14 days
Aqueous	MADEP	40mL VOA vial with Teflon lining	40mL	4°C HCl, pH<2	14 days
Total Metals excluding Mercury					
Aqueous	200.7, 200.8	Polyethylene bottle	100mL	HNO_3, pH<2	180 days
Mercury					
Aqueous	245.1	Polyethylene bottle	100mL	HNO_3, pH<2	28 days
Cyanide					
Aqueous	335.4	Polyethylene bottle	50mL	NaOH, pH>12	14 days

Table 7-3 (cont'd)

Recommended Containers, Preservation Techniques and Holding Times for Other Analyses

Analytes		Method	Containers	Required Volume*	Preservation	Holding Times
Chloride		E300.0	Polyethylene bottle	50mL	4°C	28 days
COD						
	Aqueous	SM5220D	Amber VOA vial	40mL	4°C H_2SO_4, pH<2	28 days
Color						
	Aqueous	SM2120B	Polyethylene bottle	50mL	4°C	Immediate
Nitrate						
	Aqueous	E300.0	Polyethylene bottle	50mL	4°C	48 hours
Nitrite						
	Aqueous	E300.0	Polyethylene bottle	50mL	4°C	48 hours
Orthophosphate						
	Aqueous	SM4500-P, E E300.0	Polyethylene bottle	50mL	4°C	48 hours
Total phosphate						
	Aqueous	SM4500-P B5,E	Polyethylene bottle	50mL 50mL	4°C H_2SO_4, pH<2	28 days
Phenols						
	Aqueous	SM5530B E420.1	glass	250mL	4°C H_2SO_4, pH<2	28 days
Sulfates						
	Aqueous	SM426 15th Ed. SM4500-SO4 E, E300.0	Polyethylene bottle	50mL	4°C	28 days
Sulfide Total						
	Aqueous	SM4500-S-D	Polyethylene bottle	50mL	4°C NaOH, pH>12 ZnAc	28 days
Reactivity						
	Solid	Chapter 7 SW846	Amber glass jar	10gram	4°C	28 days
	Aqueous	Chapter 7	Polyethylene bottle	250mL	4°C	28 days
Total Organic Carbon (TOC)						
	Solid	Lloyd Kahn Walkley-Black	Amber glass jar	10g	4°C	14 days

Table 7-3 (cont'd)

Recommended Containers, Preservation Techniques and Holding Times For Other Analyses

Analytes	Method	Containers	Required* Volume	Preservation	Holding Times
Total Organic Carbon					
Aqueous	SM5310B	40mL VOA vials	40mL	4°C H_3PO_4, pH<2	28 days
TKN					
Aqueous	SM4500Norg C	Polyethylene bottle or Amber glass bottle	50mL	4°C H_2SO_4, pH<2	28 days
Total Solids (TS)					
Aqueous	SM2540B	Polyethylene bottle	200mL	4°C	7 days
Total Dissolved Solids (TDS)					
Aqueous	SM2540C	Polyethylene bottle	200mL	4°C	7 days
Total Suspended Solids (TSS)					
Aqueous	SM2540D	Polyethylene bottle	200mL	4°C	7 days
Settleable Solids					
Aqueous	SM2540F	Polyethylene bottle	200mL	4°C	48 hours
Chromium (VI)					
Aqueous	SM3500 Cr+	Polyethylene bottle	25mL	4°C	24 hours
Alkalinity					
Aqueous	SM2320B	Polyethylene bottle	100mL	4°C	14 days
Ammonia					
Aqueous	SM4500NH3B	Polyethylene bottle	100mL	4°C H_2SO_4, pH<2	28 days
Oil & Grease					
Aqueous	1664	Amber glass bottle with Teflon lining	1L	4°C HCl, pH<2	28 days

* These represent minimum required volume. Additional sample volumes should be collected to minimize headspace loss for volatile analysis. Additional sample aliquots are also required to perform QA/QC functions (e.g. spikes, duplicates), % moisture for solid samples and sample re-analysis (if needed).

[a] For Massachusetts analyses, the Volatile Organics soil samples are preserved in Methanol in the field.

EPA SW-846 Method 5035 provides several options for preservation of soil samples for volatile organics. Certain projects have not adopted these options to-date, and continue to recommend the collection of unpreserved soil sample aliquots for volatiles analysis. Spectrum Analytical Inc., RI Division's preference for low-level analysis is to collect approximately 5 grams of soil into 5mL of organic-free DI water and to preserve by freezing within 48hours of collection. A separate container with approximately 5 grams of soil into 5mL of methanol is also collected for potential medium-level analysis. A separate container of unpreserved soil also must be collected to perform percent moisture analysis.

** Maine GRO soil analysis requires a medium level methanol extraction. A 10 gram sample and 10mL methanol volume is used.

8.0 SAMPLE CUSTODY

8.1 Chain of Custody:

Samples are physical evidence collected from a facility or the environment. In hazardous waste investigations, sample data may be used as evidence in (EPA) enforcement proceedings. In support of potential litigation, laboratory chain-of-custody procedures have been established to ensure sample traceability from time of receipt through the disposal of the sample.

A sample is considered to be in the custody under the following conditions:

- It is in an authorized person's actual possession, or
- It is in an authorized person's view, after being in that person's physical possession, or
- It was in an authorized person's possession and then was locked or sealed to prevent tampering, or
- It is in a secure area.

Chain-of-custody originates as samples are collected. Chain-of-custody documentation accompanies the samples as they are moved from the field to the laboratory with shipping information and appropriate signatures indicating custody changes along the way.

Laboratory chain-of-custody is initiated as samples are received and signed for by the Sample Custodian or his/her designated representative at Spectrum Analytical, Inc. RI Division. Documentation of sample location continues as samples are signed in and out of the designated storage facility for analysis in the several laboratory departments, using the Internal Chain of Custody (IntCOC) barcode system. After analysis, any remaining sample is held in the designated storage area to await disposal. Spectrum Analytical Inc., RI Division's policy is to hold spent samples for a period of at least thirty days from submittal of final report, unless other arrangements are agreed upon with the client. USEPA samples and empty containers are held for 60 days.

8.2 Laboratory Security:

Samples and all data generated from the analyses of samples at Spectrum Analytical, Inc. RI Division are kept within secure areas during all stages of residence, including the periods of time spent in preparation for analysis, while undergoing analysis, and while in storage.

The entire laboratory is designated as a secure area. The doors to the laboratory are under continuous surveillance, are kept locked after regular business hours and may only be accessed by key or keypad entry. Only authorized personnel are allowed to enter the secure areas. The laboratory facility and IT office are only accessed through keypad entry. A Spectrum Analytical, Inc. RI Division staff member must accompany visitors to the laboratory.

8.3 Duties and Responsibilities of Sample Custodian:

Duties and responsibilities of the Sample Custodian include:

8.3.1 Receiving samples.

8.3.2 Inspecting and documenting sample shipping containers for presence/absence and condition of:

8.3.2.1 Custody seals, locks, "evidence tape", etc.;

8.3.2.2 Container breakage and/or container integrity, including air space in aqueous samples, or proper preservation for soil samples for Volatiles analysis.

8.3.3 Recording condition of both shipping containers and sample containers (cooler temperature, bottles, jars, cans, etc.).

8.3.4 Signing documents shipped with samples (i.e. air bills, chain-of-custody record(s), Sample Management Office (SMO) Traffic Reports, etc.)

8.3.5 Verifying and recording agreement or non-agreement of information on sample documents (i.e. sample tags, chain-of-custody records, traffic reports, air bills, etc.). If there is non-agreement, recording the problems, contacting the project manager for direction, and notifying appropriate laboratory personnel. (Client's corrective action directions shall be documented in the case file.)

8.3.6 Initiating the paper work for sample analyses on laboratory documents (including establishing sample workorder files) as required for analysis or according to laboratory standard operating procedures.

8.3.7 Label samples with laboratory sample identification numbers and cross-referencing laboratory numbers to client numbers and sample tag numbers.

8.3.8 Scanning samples into the ICOC system.

8.3.9 Placing samples and spent samples into appropriate storage and/or secure areas.

8.3.10 Where applicable, making sure that sample tags are removed from the sample containers and included in the workorder file.

8.3.11 Where applicable, accounting for missing tags in a memo to the file or documenting that the sample tags are actually labels attached to sample containers or were disposed of, due to suspected contamination.

8.3.12 Monitoring storage conditions for proper sample preservation and prevention of cross-contamination.

8.3.13 Sending shipping containers with prepared sample bottles and sample instructions to clients who request them.

8.3.14 Calibrating the non-contact infrared temperature gun quarterly.

8.3.15 Disposal of samples after a specified time period determined by contract or client request.

8.4 Sample Receipt:

The Sample Custodian or his/her designated representative receives sample shipments at Spectrum Analytical, Inc. RI Division. Unless the shipment is a continuation of a previous workorder, a new workorder file is started for the sample.

The cooler is inspected for the following (if applicable) and findings are documented on the Sample Login Form (Figure 8.4-1) for USEPA CLP samples, and on the Sample Condition Form (Figure 8.4-2) for all other samples:

- Custody seal (conditions and custody number)
- Air bill (courier and air bill #)

The cooler is then opened and the following items are checked (in order). Make sure the hood is turned on when the cooler is opened.

- Chain of custody (COC) records (or traffic report). These are usually taped to the inside of the cooler cover.
- Radioactivity using the Geiger counter, which continuously monitors the receiving area for radiation
- Cooler temperature using the non-contact infrared temperature gun. Record the temperature of a temperature blank if available, using a calibrated thermometer. Record each temperature on the COC.

The Sample Custodian will perform the following:

- Remove the sample containers and arrange them in the same order as documented in the chain of custody report.
- Inspect condition of the sample containers.
- Assign laboratory sample ID and cross-reference the laboratory ID to the client ID.
- Remove tags and place in the workorder file.
- Check preservative and document in the Sample Condition Form (Figure 8.4-2) if needed. If additional preservative is needed, it is added at this time.
- Check for air bubbles in aqueous samples and for proper preservation and immersion of soil samples designated for volatile organic analysis.
- Ensure peer review occurs for proper cross-referencing and labeling of sample containers.

Any discrepancies or problems are noted in the Sample Condition Notification Form (Figure 8.4-3).

The sample custodian conveys the information to the project manager who will in turn inform the client, or may directly inform the client of the discrepancies.

Samples can be rejected at Spectrum Analytical, Inc. RI Division for any of the following reasons:

1. Complete and proper documentation was not sent with the samples.
2. Sample labels cannot be identified because indelible ink was not used during the sampling procedure.
3. Hold times had already been exceeded when samples arrived at the laboratory.
4. Inadequate sample volume.
5. Potential cross-contamination has occurred among samples.
6. Samples are inadequately preserved.
7. The samples or shipping container is badly destroyed during shipping.
8. The samples are potentially radioactive.
9. The samples represent untreated fecal waste for which Spectrum Analytical Inc., RI Division employees are currently not inoculated against.

In all instances, the client is contacted initially before any action is taken at Spectrum Analytical, Inc. RI Division.

The Sample Custodian signs the Sample Receipt Form and originates a file folder for the set of samples. The following forms are included in the file: the Sample Receipt Form, chain of custody records, shipping information, and an orange

Sample Condition Notification Form if any problems or discrepancies need to be addressed.

When the Sample Custodian is not available to receive samples, another lab staff member will sign for the sample container. The time, date and name of the person receiving the container are recorded on the custody records. In addition, the cooler temperature is measured and recorded on the Sample Condition Form. The samples are then stored in the centralized walk-in refrigerator in the sample receipt area. The sample receipt area is located in the secure central storage facility of the laboratory. VOA samples are stored in the VOA analysis laboratory. The samples are officially received and documented by the Sample Custodian or designee before the next business day.

At times, samples will be sent to another lab for analysis not performed at Spectrum Analytical, Inc. RI Division. These subcontracted analyses are performed by laboratories certified to perform the analyses. The use of a subcontractor laboratory is discussed with the client prior to sending samples, per Spectrum Analytical, Inc. RI Division's Project Management Standard Operating Procedure.

These samples are packed to prevent breakage and stored in a cooler in the walk-in or stored in the small refrigerator in the central storage facility. The samples are either hand delivered to a local sub-contract lab, or shipped with sufficient coolant to maintain a 4 degree temperature by air courier under Spectrum Analytical, Inc. RI Division's chain-of-custody (Figure 8.4-4).

8.5 Sample Log-in Identification:

8.5.1 Sample Identification:

To maintain sample identity, each sample received at Spectrum Analytical, Inc. RI Division is assigned unique sample identification (Sample ID) numbers. Samples are logged into the laboratory via the Laboratory Information Management System (LIMS).

After inspecting the samples, the Sample Custodian logs each sample into the LIMS, which assigns a lab Sample ID Number. These Numbers are assigned sequentially in chronological order. Spectrum Analytical Inc., RI Division Sample Identification Numbers appear in the following format:
YXXXX-NNF

In which: Y – represents the current year with A for 2002, B for 2003, C for 2004, etc.
XXXX – represents a four-digit work order number that is assigned sequentially to each submittal of samples
NN – represents the sample number within the group or workorder.

F – represents the fraction. All sample portions that are received in identical bottles with identical preservatives are grouped into one fraction.

For example, the first fraction of the fifth sample of the 20^{th} workorder of 2003 would have the number: B0020-05A

The Sample ID Number is recorded on the Sample Login Form (Figure 8.4-1) for USEPA CLP samples, and on the Sample Condition Form (Figure 8.4-2) for all other samples. Information on these forms cross-reference the Sample ID Numbers with SDG numbers, sample tag numbers and/or other client identifiers. Each sample is clearly labeled with its lab Sample ID Number by the Sample Custodian. The same sample ID Number appears on the LIMS status report, on each sample preparation container and extract vial associated with the sample.

8.5.1.1 Sample Extract Identification:

As described in Section 8.5.1, a sample extract is identified with the same unique sample identification number as the sample from which it derives

8.5.2 Sample Login:

The sample login system at Spectrum Analytical, Inc. RI Division consists of computerized entry using LIMS (Figure 8.5-1). The information recorded onto the Workorder Report includes:

- Workorder number
- Client name
- Project name and location
- Final data report format
- Date of receipt
- Date sample collected
- Due date, fax and/or hardcopy
- EDD requirements
- Comments or notes on the workorder
- Lab Sample Identification numbers
- Client Sample Identification numbers
- Sample matrix
- Analyses required
- Case number, where used by the client
- SDG number, where used by the client

8.5.3 Sample Information:

After sample information is properly recorded and the samples have been properly logged into the LIMS, bottle labels are generated and applied to the sample containers. The Sample Custodian notifies the Project Manager or peer or supervisor to review the sample bottle labeling. This person reviews all the information associated with the samples. He/she verifies (by initialing) the correctness of the information on the Sample Condition Form or Sample Log-In Form. Sample login information is available through the LIMS to all appropriate laboratory staff. The Sample Custodian then scans the samples into the IntCOC system and posts the samples.

The Sample Custodian initiates a red workorder file. This file contains the original Sample Log-In Form or Sample Condition Form, air bills, SMO traffic reports, sample tags, workorder reports and all correspondence with the Client or SMO or others. The red workorder file is forwarded to the Project Manager for review of the login paperwork, and for updating status of the workorder in the LIMS. Once the login information is thoroughly reviewed for correctness, the red workorder file is stored in the data reporting area. Analytical data are placed in this as analyses are completed and data are reviewed.

8.6 Sample Storage and Disposal:

Samples at Spectrum Analytical, Inc. RI Division are stored in a central storage facility or in satellite designated areas, (see SOP 30.0003 Sample Receipt Storage Tracking and Disposal). After sample receipt and login procedures are completed, the Sample Custodian places the samples in the centralized walk-in refrigerator. Volatile Organic sample aliquots are released to the volatile organic lab with documentation (Figure 8.6-1).

The central storage facility is for samples only; no standards or reagents are to be stored there. Access to the centralized sample storage facility is limited by keypad entry at all times. All sample storage areas are within the secure laboratory facility.

All sample/extract refrigerators are maintained at 4°C ± 2°C. Standards are kept in freezers maintained at -10 to -20°C. The temperature is recorded electronically using temperature probes that are affixed inside all refrigerator and freezer units (see SOP #80.0020 Temperature Monitoring Systems).

When analysis is complete, any remaining sample is retained in the designated storage facility until it may be removed for disposal (see SOP 30.0024 Sample Disposal). Broken and damaged samples are promptly disposed in a safe manner. Unless there is a specific request by the client, excess, unused sample aliquots are stored for at least 30 days after the submission of compliant data (USEPA is 60 days for samples and empty containers). The samples are then disposed after such period. USEPA and NYS ASP extracts are stored under refrigeration for at least one year. Other extracts are stored under refrigeration for up to three months, unless there is a specific agreement with the client. After such time, the extracts are disposed. All disposals are performed in a manner compliant with federal and state regulations. International samples require special disposal procedures associated with the USDA Soil Permit (see SOP #30.0024 Sample Disposal).

8.6.1 Extract Transfer:

The extracts generated during the preparation for the organic analyses are transferred from the Organic Prep Lab to the Analysis Labs. The transfer of extracts for Semivolatiles, TPH, Pesticides and PCBs, are documented electronically in the Prep Batch Log with the storage location (refrigerator ID).

Metals analysis samples that are transferred from the prep area to the analysis room are also documented in the Prep Batch Log with the storage location (ICP or Hg lab).

There is no extract transfer that occurs with either Wet Chemistry or VOA samples.

8.6.2 Extract Storage:

Semivolatile, Pesticide/PCB, and TPH extracts, which are contained in crimp top vials or screw cap vials with Teflon lined septa, are stored at 4°C ± 2°C. Semivolatile and Pesticide/PCB extracts are stored in refrigerators in the Semivolatiles Analysis room. They are catalogued numerically by workorder number that approximates chronological order, according to date of receipt. USEPA CLP extracts are stored separately within the refrigerator from sample extracts of other clients.

Excess Pesticide extracts, not analyzed, are stored in screw cap vials with Teflon lined septa in the Organic Prep Lab. In most instances, they consist of the remaining 8-9 mL aqueous and soil sample extracts and are stored chronologically by workorder.

8.7 Sample Tracking:

When a sample is removed from storage, the analyst must scan each jar or bottle taken, using the IntCOC program and their user ID. When the sample(s) are returned to the central storage facility, the analyst must scan the samples back into the system using the IntCOC program and their user ID, and return the physical samples to their original storage location. In addition to the individual's initials, the date and time is recorded. This system maintains the location of the sample at any point in time.

Chain-of-custody of a sample ensures that the sample is traceable from the field, where it was taken, through laboratory receipt, preparation, analysis and finally disposal. The primary chain-of-custody documents are used to locate a sample at any point in time.

1. The chain-of-custody form from the field describes the origin and transportation of a sample;

2. The ICOC document acceptance of a sample by Spectrum Analytical Inc., RI Division; and

3. The ICOC documents which analyst has custody of the sample after removal from storage.

4. The sample preparation logs and/or extract transfer logs document when the extracts or digestates were received by the analytical labs and where they are stored in the refrigerator.

Figure 8.4-1
USEPA CLP Sample Login Form

SAMPLE LOG-IN SHEET
FORM DC-1

Lab Name					Page _____ of _____
Received By (Print Name)					Log-in Date
Received By (Signature)					
Case Number		Sample Delivery Group No.			Mod. Ref. No.
Remarks:		EPA Sample #	Corresponding Sample Tag #	Corresponding Assigned Lab #	Remarks: Condition of Sample Shipment, etc.
1. Custody Seal(s)	Present/Absent* Intact/Broken				
2. Custody Seal Nos.	________________				
3. Traffic Reports/ Chain of Custody Records (TR/COCs) or Packing Lists	Present/Absent*				
4. Airbill	Airbill/Sticker Present/Absent*				
5. Airbill No.	________________				
6. Sample Tags	Present/Absent*				
Sample Tag Numbers	Listed/Not Listed on Chain-of-Custody				
7. Sample Condition	Intact/Broken*/ Leaking				
8. Cooler Temperature Indicator Bottle	Present/Absent*				
9. Cooler Temperature	________________				
10. Does information on TR/COCs and sample tags agree?	Yes/No*				
11. Date Received at Laboratory	________________				
12. Time Received	________________				
Sample Transfer					
Fraction	Fraction				
Area #	Area #				
By	By				
On	On				

* Contact SMO and attach record of resolution

Reviewed By	Logbook No.
Date	Logbook Page No.

SAMPLE LOG-IN SHEET

Lab Name: Spectrum Analytical Inc., Rhode Island Division		Page __ of __
Received By (Print Name)		Log-in Date
Received By (Signature)		
Case Number	Sample Delivery Group No.	Mod. Ref. No.

Remarks:	
1. Custody Seal(s)	Present/Absent* Intact/Broken
2. Custody Seal NOs.	________ ________
3. Traffic Reports/Chain of Custody Records or Packing Lists	Present/Absent*
4. Airbill	Airbill/Sticker Present/Absent*
5. Airbill No.	________ ________
6. Sample Tags Sample Tag Numbers	Present/Absent* Listed/Not Listed on Traffic Report/Chain of Custody Record
7. Sample Condition	Intact/Broken*/ Leaking
8. Cooler Temperature Indicator Bottle	Present/Absent*
9. Cooler Temperature	________
10. Does information on Traffic Reports/Chain of Custody Records and sample tags agree?	Yes/No*
11. Date Received at Lab	________
12. Time Received	________

Sample Transfer	
Fraction	Fraction
Area#	Area#
By	By
On	On

	EPA Sample #	Aqueous/ Water Sample pH	Corresponding		Remarks: Condition of Sample Shipment, etc.
			Sample Tag #	Assigned Lab #	
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

* Contact SMO and attach record of resolution

Reviewed By	Logbook No.
Date	Logbook Page No.

Figure 8.4-2
Sample Condition Form

SPECTRUM ANALYTICAL, INC. RI DIVISION

Sample Condition Form

Received By:	Reviewed By:	Date:	Spectrum RI Work Order #:
Client Project:		Client:	

		Lab Sample ID		Preservation (pH) HNO3	H2SO4	HCl	NaOH	H3PO4	VOA Matrix	Soil Headspace or Air Bubble ≥ 1/4"
1) Cooler Sealed	Yes / No									
2) Custody Seal(s)	Present / Absent									
	Coolers / Bottles									
	Intact / Broken									
3) Custody Seal Number(s)	______									
	______									
	______									
	______									
4) Chain-of-Custody	Present / Absent									
5) Cooler Temperature	______									
IR Temp Gun ID	______									
Coolant Condition	______									
6) Airbill(s)	Present / Absent									
Airbill Number(s)	______									
	______									
	______									
	______									
7) Samples Bottles	Intact / Broken / Leaking									
8) Date Received	______									
9) Time Received	______									
Preservative Name/Lot No.:										

______
______
______
______
______

VOA Matrix Key:

US = Unpreserved Soil	A = Air
UA = Unpreserved Aqueous	H = HCl
M = MeOH	E = Encore
N = NaHSO4	F = Freeze

See Sample Condition Notification/Corrective Action Form yes / no

Form ID: QAF.0006 Rad OK yes / no

Figure 8.4-3
Sample Condition Notification Form

Spectrum Analytical, Inc. RI Division Sample Condition Notification

Project#:______________ **Date of Receipt:______________**
Client:________________________ **Received By:_________________**
Client project #/name:_________________________

Unusual Occurance Description:

____
____
____
____
____
____

Client Contacted:

Contacted via: Phone/Fax/E-mail
Date:___________ Time:____________
Contacted By:__________________________
Name of person contacted:_________________________

Client Response:

Responded via: Phone/Fax/E-mail
Date:_____________
Name of person responding:___________________________
Responding to:__________________________

____
____
____
____
____

Action Taken: ____
____
____
____
____

Form ID: QAF.0005

Figure 8.4-4
Spectrum Analytical, Inc. RI Division Chain-of-custody Form

SPECTRUM ANALYTICAL, INC.
Featuring
HANIBAL TECHNOLOGY

CHAIN OF CUSTODY RECORD

☐ 11 Almgren Drive
Agawam, MA 01001
(413) 789-9018

☐ 8405 Benjamin Road, Ste A
Tampa, FL 33634
(813) 888-9507

☐ 646 Camp Avenue
N Kingstown, RI 02852
(401) 732-3400

Special Handling:

TAT- Indicate Date Needed: __________

- All TATs subject to laboratory approval. Min. 24-hour notification needed for rushes.
- Samples disposed of after 60 days unless otherwise instructed.

Report To: ______________________________

Telephone #: ______________________________

Project Mgr. ______________________________

Invoice To: ______________________________

P.O. No.: ______________ RQN: ______________

Project No.: ______________________________

Site Name: ______________________________

Location: ______________________ State: ________

Sampler(s): ______________________________

1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid 7=CH_3OH
8= $NaHSO_4$ 9= Deionized Water 10=H_3PO_4 11= ______________ 12= ______________

List preservative code below:

QA/QC Reporting Notes:

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW= Surface Water SO=Soil SL=Sludge A=Air
X1= ______________ X2= ______________ X3= ______________

G=Grab C=Composite

Containers:

Analyses:

QA/QC Reporting Level

☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other ______________

State-specific reporting standards:
____

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic										

Relinquished by:	Received by:	Date:	Time:	Temp°C

☐ EDD Format ______________________________

☐ E-mail to ______________________________

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

Figure 8.5-1
Workorder Information Form

Spectrum Analytical, Inc. Featuring Hanibal Technology -- Rhode Island Division

WorkOrder: L1458

Client ID: MITKEM_WARWICK
Project: INTERNAL TESTING
WO Name: INTERNAL TESTING
Location: WATER_TESTING, WW, 6/2012
Comments: Internal test

Case:
SDG:
PO: INTERNAL TESTING

HC Due: 07/12/12
Fax Due:
Fax Report: ☐

Report Level: LEVEL 2
Special Program:
EDD:

Lab Samp ID	Client Sample ID	Collection Date	Date Recv'd	Matrix	Test Code	Samp / Lab Test Comments	HF	HT	MS	SEL	Storage
L1458-01A	WW-6/28-G	06/28/2012 08:05	06/28/2012	Aqueous	E624	/				Y	VOA
L1458-01B	WW-6/28-G	06/28/2012 08:05	06/28/2012	Aqueous	E625	/ Needs benzidine, 1,2-diphenyhydr, n-nitrosodimethl				Y	Disposed
L1458-01C	WW-6/28-G	06/28/2012 08:05	06/28/2012	Aqueous	E335.4	/					Disposed
L1458-02A	WW-6/28-C	06/28/2012 15:00	06/28/2012	Aqueous	E200.7	/ Cd, Cr, Cu, Pb, Ni, Ag, Zn				Y	Disposed
L1458-02B	WW-6/28-C	06/28/2012 15:00	06/28/2012	Aqueous	SM5220	/					Disposed

HF = Fraction logged in but all tests have been placed on hold

HT = Test logged in but has been placed on hold

Figure 8.6-1
Volatiles Receiving Logbook Form

Spectrum Analytical, Inc. RI Division : VOLATILE SAMPLES RECEIVING LOGBOOK

VOA Log-In Date	Workorder	Client ID	Sample Numbers	Relinquished by:	Received by:	Pres. Used	F/R	Returned to R1

Logbook ID 90.0191-04/12

Reviewed By:

"Preservative Used" Key

UA = Unpreserved Aqueous **H** = HCL **A** = Air **M** = MeOH **E** = Encore

US = Unpreserved Soil **N** = $NaHSO_4$ **F** = Freeze **T** = Trace, HCL

9.0 CALIBRATION PROCEDURES AND FREQUENCIES

All purchased equipment, materials, and services must meet specific method requirements, standard requirements, or project specific requirements. These requirements are documented in the individual analytical or project SOPs.

9.1 Instruments:

Specific calibration and check procedures are given in the analytical methods referenced in Section 10. The frequencies of calibration and the concentrations of calibration standards are determined by the cited methods and any special project or contract-specific requirements. Standard calibration curves of signal response versus concentration are generated on each analytical instrument used for a project, prior to analysis of samples. A calibration curve of the appropriate linear range is established for each parameter that is included in the analytical procedure employed and is verified on a regular basis with check standards as specified in the appropriate CLP Protocols. For non-CLP work, Spectrum Analytical, Inc. RI Division adheres to the calibration criteria specified by SW-846 and/or Standard Methods for both organic and inorganic analyses. Where requested, other method specific calibration criteria are used. Refer to the individual Standard Operating Procedures listed in Figure 11.7-1 of this QAP for the specific calibration and check procedures as well as concentration and frequency requirements.

For organic analyses whenever possible, unless otherwise specified in the individual methods, the initial calibration standards (ICAL), continuing calibration verification standards (CCV), laboratory control sample spike (LCS) and matrix spike (MS) will all be from the same source. The initial calibration verification (ICV) standards are prepared from a separate source. Refer to the Standard Operating Procedures listed in Figure 11.7-1 of this QAP for the specific calibration source and procedural requirements of each method. The following are examples of calibration procedures for various instrumental systems:

GC/ECD and GC/FID – An initial calibration is performed using five different concentration levels for each parameter of interest for SW-846 analyses. The initial calibration is done on each column and each instrument, and is repeated each time a new column is installed or whenever a major change is made to the chromatographic system.

Initial calibration verification (ICV), near mid level concentration for all analytes, is performed immediately after the calibration. If the ICV does not meet method specific criteria, a new calibration curve is generated and an ICV is analyzed. If repeated ICV failures are encountered, the system is checked to find the cause of these failures, and the problem is corrected. For certain GC/FID analyses (i.e. GRO /DRO), the instrument is calibrated using individual compounds while the laboratory control sample or ICV uses a product (diesel or gasoline).

Continuing calibration verification (CCV), near a mid-level concentration for all analytes, is run at intervals determined by sample number or time allowed, as required by the individual methods. If CCV values are determined outside the upper limit of the method specified range and if no analytes were detected in the samples, the run will be accepted as valid and 'Non Detects' reported for the sample. If an analyte is detected and the CCV is out at the high end, the problem will be identified and corrected and the affected samples will be re-analyzed with a compliant CCV.

If a CCV value is out of the method specified limits at the lower limit, the cause of the problem will be identified and corrected, and all samples affected by the out of control CCV will be rerun with a compliant CCV.

For CLP-type analyses, the continuing calibration takes place at the beginning of the analytical sequence and once every twelve (12) hours throughout the analytical sequence, and again at the end of the sequence. The percent difference in calibration factors for each standard must not exceed the criteria specified by the method.

If a CCV fails to meet criteria limits, a new calibration curve will be generated and all samples affected will be re-analyzed.

GC/MS – For CLP methods, a minimum of five-level calibration (four-level for select semivolatile compounds) is carried out for each analyte per system before analysis of samples take place.

Continuing calibrations, near midpoint levels, are analyzed every twelve hours of instrument analysis time for CLP analyses.

Re-calibration takes place whenever a major change occurs in the system, such as a column change in the GC or a source cleaning of the mass spectrometer or when the continuing calibration fails to meet method specific requirements.

Tunes are performed once every twelve (12) hours of instrument run time for all CLP-type and SW846 analyses. The GC/MS system is tuned to USEPA specifications for bromofluorobenzene (BFB) or decafluorotriphenylphosphine (DFTPP) for volatile and semivolatile analyses, respectively. Extended tune time is allowed in CLP SOM protocols where an ending CCV is acceptable as an opening CCV.

More detailed instrument and method-specific calibration procedures and criteria are described in the individual analysis SOPs.

ICP/AES and ICP/MS – Instrument calibration, for each wavelength used, occurs at the start of each analysis. The calibration curve is constructed per method specification.

An initial calibration verification and initial calibration blank (ICB) are analyzed before analysis of samples. If the ICV and ICB do not meet method specific criteria for an analyte, the analyte is re-analyzed with a new calibration.

During the analysis, a continuing calibration verification (CCV) and continuing calibration blank (CCB) is analyzed at least every ten (10) samples or two hours depending on method. If either the CCV or CCB fails to meet method specific criteria for an analyte, the source of the problem is investigated. If it can be determined that the failed CCV and/or CCB is not representative (such as for instrument carryover from previous sample or from an empty autosampler tube), the CCV and/or CCB are re-analyzed and the reason for the failure documented. If a failure still occurs, further corrective action is performed, and the analyte is re-analyzed with a new calibration.

The CCV is obtained from a source independent from that of the standards. The CCV concentration for the different analytes are at method specified levels.

The Flow Injection Mercury System (FIMS) - Instrument calibration occurs at the start of each analysis. The calibration curve is constructed per method specification.

An initial calibration verification (ICV) and initial calibration blank (ICB) are analyzed before analysis of samples. If the ICV and ICB do not meet method specific criteria for Mercury, re-calibration and reanalysis are required.

During the analysis, a continuing calibration verification (CCV) and continuing calibration blank (CCB) is analyzed at least every ten (10) samples. If either the CCV or CCB fails to meet method specific criteria for Mercury, the source of the problem is investigated. If it can be determined that the failed CCV and/or CCB is not representative (such as for instrument carryover from previous sample or from an empty autosampler tube), the CCV and/or CCB are re-analyzed and the reason for the failure documented. If a failure still occurs, further corrective action is performed, and the analyte is re-analyzed with a new calibration.

The CCV is obtained from a source independent from that of the standards. The CCV concentration for Mercury is at method specified levels.

Other instrumentation:

IC- The Ion Chromatograph is calibrated each day of use. Calibration verification is analyzed at the beginning, end, and at least every 10 samples. The verification standard is from an independent source. If the calibration verification does not meet method specific criteria for an analyte, it is re-analyzed once. If failure still occurs, a new calibration curve is established and any affected samples are reanalyzed.

pH- the meter is calibrated at two pH levels (4.0 and 10.0) before analyses of samples. The pH 7.0 buffer is analyzed as an LCS and recovery is calculated.

Lachat 8000- automated flow-through spectrophotometer is calibrated per method specification before the analyses of samples.

An initial calibration verification and initial calibration blank (if required) are analyzed before analysis of samples. If the ICV and/or ICB do not meet method specific criteria for an analyte, re-calibration must occur.

During the analyses, continuing calibration verification and continuing calibration blanks are analyzed at least every ten (10) samples. If either the CCV or CCB fails to meet specified criteria for an analyte, the source of the problem is investigated. If it can be determined that the failed CCV and/or CCB is not representative (such as for instrument carryover from previous sample or from an empty autosampler tube), the CCV and/or CCB are re-analyzed and the reason for the failure documented. If a failure still occurs, further corrective action is performed, and the analyte is re-analyzed with a new calibration.

The CCV is obtained from a source independent from that of the standards. The CCV concentration for the different analytes are at method specified levels.

SpecGenesys- manual spectrophotometer is calibrated per method specification.

Calibration curve calibration verification is analyzed at the beginning, end, and at least every 10 samples. The verification standard is from an independent source. If the calibration verification does not meet method specific criteria for an analyte, it is re-analyzed once. If failure still occurs, a new calibration curve is established and any affected samples are reanalyzed. Calibration curves are established at least quarterly.

Annual calibration and preventative maintenance is required by an outside vendor unless calibration can be performed in-house using a calibration kit.

Balances: are calibrated by an outside source on an annual basis.

The balances are calibrated externally each day of use by a lab technician with NIST traceable Class "1" or "2" weights. The weights are certified by an outside service on a regular basis, not to exceed five years.

Thermometers are calibrated once a year against a NIST-verified thermometer or as they are replaced. Digital thermometers are verified quarterly. The NIST-verified thermometers are certified by an outside certified service annually.

Gel Permeation Chromatography is used to clean samples according to CLP and client requirements. GPCs are calibrated using a calibration standard provided by Ultra Scientific, Cat. # CLP-340. Once a successful calibration is achieved it is valid for a period of seven days.

9.2 Standards and Reagents:

Standard reference materials used for routine calibration, calibration checks, and accuracy are obtained from commercial manufacturers. These reference materials are traceable to the source and readily compared to EPA references. All standards come with a Certificate of Analysis which is kept on record in the appropriate laboratories. When a chemical standard can not be purchased in solution form, a neat source may be bought. The lab must attempt to obtain the highest purity available. If the lab can not find a neat source with at least 97% purity, the laboratory must document why. In addition, the impurity correction factor must be used when calculating the standard concentration. See SOP #80.0001, Standard Preparation, Equivalency and Traceability, for more details. While most standards are traceable to NIST; however, certain projects, especially those involving pesticide registration, may necessitate the use of reference standards supplied by the client. New standards are also routinely validated against known standards that are traceable to EPA or NIST reference materials.

Organic Preparatory Lab Surrogate and Matrix spikes are prepared in the appropriate instrument labs and then QA'd by diluting the standard and analyzing it on the GC or GC/MS. Criteria for the diluted spike analysis must meet the method or in-house criteria. If acceptable, the spike is able to be used. If unacceptable, another standard is prepared and the same steps repeated. Data from the QC analysis is retained in the laboratory for reference and traceability.

Primary, intermediate and working standards are all named using specific nomenclature as designated in the QA Department SOP# 80.0001, Standard Preparation, Equivalency and Traceability.

Standards are dated and labeled upon arrival. Any material exceeding its shelf life as described by the methods in QAP Section 10 is discarded and replaced. Standards are periodically analyzed for concentration changes/degradation and inspected for signs of deterioration such as color change and precipitate formation. Standards Logbooks, which contain all pertinent information regarding the source and preparation of each analytical standard, are maintained by each of the laboratory departments in the LIMS.

See individual analytical SOPs (listed in Figure 11.7-1), sections 7 and 8 for standards preparation procedures.

Solvents are tested for purity prior to use to ensure there is no external source of contamination. For organic solvents, each lot number of solvent is QC'd prior to use. This is accomplished by concentrating an aliquot of solvent or extracting with reagent media (such as sodium sulfate) in the same manner as the samples and analyzing it for contamination by GC/MS. Any detectable analyte could render the solvent or reagent unsuitable for use. Supervisors make the final decision as to the suitability of the solvent or reagent, and whether the lot may be used for standard or sample preparation.

Chemicals and Reagents are stored in the respective laboratories during use. Backup supplies are stored in the stockroom. Reagent grade chemicals are used in all tests. All dry chemicals and reagents are given a 5-year expiration period unless designated otherwise by the manufacturer. Sometimes the viability of the reagent does not remain throughout the entire 5-year period (as determined through investigation following poor results in a preparation method blank or bench analysis, for example). In this case, the chemical or reagent is readily discarded. Acids/caustics are given a 3-year expiration period unless designated otherwise by the manufacturer. Solvents are given a 1-year expiration period unless designated otherwise by the manufacturer.

Chemicals and reagents are logged into the laboratory and each bottle is given a unique ID. The ID is based upon the date of its arrival at the laboratory. The only exceptions include cases/cycletainers of solvents and cases of acids. For solvents and acids, the boxes/cases are labeled with received date to insure first in/first out usage. All other chemicals and reagents are named using specific nomenclature as designated in the QA Department SOP # 80.0013, Reagent Purchasing and Tracking.

When a bottle is opened in the laboratory, it is inspected to ensure it meets the requirements of the method. The analyst records his or her initials on the bottle along with the date opened and the ID. Any applicable certificates of analysis (COA) are scanned and archived. They may also be stored in the individual laboratories or in the QA Department.

10.0 ANALYTICAL PROCEDURES

Spectrum Analytical, Inc. RI Division uses the methods specified in Tables 10-1 through 10-6 unless otherwise specified by the client. Spectrum Analytical, Inc. RI Division performs analyses on non-potable waters, groundwater and soil/solids. The RI Division does not perform regulatory potable (drinking) water analyses with the exception of trace metals by EPA 200.8, or environmental lead (paint chips, wipes, etc. for RIDOH compliance) testing. Associated Standard Operating Procedures related to these analytical procedures can be found in Figure 11.7-1 of this QAP.

Table 10-1
Potable Water Analytical Methods

Parameter	Method Description	Method Reference
Metals	ICP-MS	200.8

Table 10-2
Non-potable Water Analytical Methods

Parameter	Method Description	Method Reference
Metals	ICP-AES	200.7
Mercury	Cold Vapor	245.1
Cyanide		
	Midi-distillation Automated	EPA 335.4
Alkalinity	Titration	SM2320B
Anions Chloride Sulfate Nitrate Nitrite Orthophosphate Bromide Fluoride	Ion Chromatography	EPA 300.0
Volatile Fatty Acids Acetic Butyric Lactic Propionic Pyruvic	Ion Chromatography	EPA 300.0 Mod
pH	Electrode	SM4500 H+ B
Sulfate	Turbidimetric	SM4500-SO4 E.
Ammonia	Distillation/Titration	SM4500-NH3 B, C
Total Kjeldahl Nitrogen	Digestion Distillation/Titration	SM4500- Norg C SM4500- NH3 B, C
Orthophosphate	Ascorbic, Manual	SM4500-P E
Total phosphate	Persulfate, Manual	SM4500-P B5 & E

Table 10-2
Non-potable WaterAnalytical Methods (cont.)

Parameter	Method description	Method Reference
Chemical Oxygen Demand	Spectrophotometric(Closed Reflux)	SM5220-D
Total Organic Carbon	Combustion	SM5310 B
Phenols	Distillation, 4-AAP, Direct Photometric	SM5530 B E420.1
Total Dissolved Solids	Gravimetric	SM2540 C
Total Solids	Gravimetric	SM2540 B
Total Suspended Solids	Gravimetric	SM2540 D
Total Settleable Solids	Imhoff cones	SM2540 F
Hexavalent Chromium	Diphenyl Carbazide Colorimetric	SM 3500Cr B
Volatile Organics		
Halocarbons	Purge & Trap, GC/MS	624
Aromatics	Purge & Trap, GC/MS	624
Semivolatile Organics	Extraction, GC/MS	625
Organochlorine Pesticides/ PCBs	Extraction, GC/ECD	608
Oil & Grease (HEM, SGT)	Extraction, Gravimetric	1664A

Table 10-3
SW-846 Inorganic Analytical Methods

Parameter	Method Description	Method Reference
Metals		
Aqueous	Acid digestion ICP/AES ICP/MS	Method 3005A/3010A Method 6010C Method 6020A
Solid	Acid digestion ICP/AES ICP/MS	Method 3050B Method 6010C Method 6020A
Mercury		
Aqueous	Permanganate digestion Cold Vapor analysis	Method 7470A
Solid	Permanganate digestion Cold Vapor analysis	Method 7471B
Hexavalent Chromium		
Aqueous	Colorimetric	Method 7196A
Solid	Acid Digestion Colorimetric	Method 3060A/7196A
Cyanide		
Aqueous	Midi-distillation Automated	Method 9012B
Solid	Midi-distillation Automated	Method 9012B
pH		
Solid	Electrode	Method 9045D
Ignitability (Flashpoint)		
Aqueous	Pensky-Martens closed cup	Method 1010A
Solid	Pensky-Martens closed cup	Method 1010A Mod.
Reactive Cyanide		
Solid & Aqueous	Distillation Automated	SW 846 7.3.3.2

Table 10-3
SW-846 Inorganic Analytical Methods (cont.)

Parameter	Method Description	Method Reference
Reactive Sulfide Solid & Aqueous	Distillation Colorimetric	SW 846 7.3.4.2
Anions Chloride Sulfate Nitrate Nitrite Orthophosphate Bromide Fluoride	Ion Chromatography	SW 846 9056A
Total Organic Carbon	Combustion	SW 846 9060A
Toxicity Characteristic Leaching Procedure (TCLP)		
Aqueous	Leachate by Filtration	Method 1311
Solid	Leachate Generation	Method 1311
Synthetic Precipitation Leaching Procedure (SPLP)		
Aqueous	Leachate by Filtration	Method 1312
Solid	Leachate Generation	Method 1312

Table 10-4
SW-846 Organic Analytical Methods

Parameter	Sample Preparation	Sample Analysis
Volatile Organic Compounds		
Aqueous	Method 5030B	Method 8260C
Solid	Method 5035A	Method 8260C
1,2-Dibromo-3-chloropropane 1,2-Dibromomethane	Micro extraction GC\ECD Analysis	Method 8011
Semivolatile Organic Compounds		
Aqueous	Method 3510C Method 3520C	Method 8270D
Solid	Method 3540C Method 3550B Method 3545 Method 3570	Method 8270D
Organochlorine Pesticides		
Aqueous	Method 3510C Method 3520C	Method 8081B
Solid	Method 3540C Method 3550B Method 3545 Method 3570	Method 8081B
Polychlorinated Biphenyls (Aroclors and Congeners)		
Aqueous	Method 3510C Method 3520C	Method 8082A
Solid	Method 3540C Method 3550B Method 3545 Method 3570	Method 8082A
Total Petroleum Hydrocarbons		
Aqueous	Method 3510C Method 3520C	Method 8015B,D
Solid	Method 3540C Method 3550B	Method 8015B,D

Table 10-4
SW-846 Organic Analytical Methods (cont.)

Parameter	Sample Preparation	Sample Analysis
Herbicides		
Aqueous	Method 8151A	Method 8151A
Solid	Method 8151A	Method 8151A
Toxicity Characteristic Leaching Procedure (TCLP)		
Aqueous	Method 1311	
Solid	Method 1311	
Synthetic Precipitation Leaching Procedure (SPLP)		
Aqueous	Method 1312	
Solid	Method 1312	
Gel Permeation Chromatography (GPC)		
Aqueous	Method 3640A	
Solid	Method 3640A	
Florisil Cleanup		
Aqueous	Method 3620B	
Solid	Method 3620B	
Silica Gel Cleanup		
Aqueous	Method 3630C	
Solid	Method 3630C	
Sulfur Cleanup		
Aqueous	Method 3660B	
Solid	Method 3660B	
Sulfuric Acid Cleanup		
Aqueous	Method 3665A	
Solid	Method 3665A	

Table 10-5
CLP-Type Analytical Methods

Parameter	Method Reference
USEPA CLP Organics	OLM04.3, SOM01.2
USEPA CLP Inorganics	ILM05.4, ISM01.3
USEPA Low Level Organics	OLC03.2
NYS-ASP CLP Organics	ASP 2000/2005 SOW
NYS-ASP CLP Organics	ASP 2000/2005 SOW

Table 10-6
Other Analytical Methods

Parameter	Method Reference
Volatile Petroleum Hydrocarbons	
Aqueous	MADEP VPH 1.1
Solid	MADEP VPH 1.1
Extractable Petroleum Hydrocarbons	
Aqueous	MADEP EPH 1.1
Solid	MADEP EPH 1.1
Extractable Total Petroleum Hydrocarbons	
Aqueous	CT ETPH 99-3
Solid	CT ETPH 99-3
Diesel Range Organics	
Aqueous	ME 4.1.25
Solid	ME 4.1.25
Gasoline Range Organics	
Aqueous	ME 4.2.17
Solid	ME 4.2.17

10.1 Analytical References

1. Analysis of Extractable Total Petroleum Hydrocarbons (ETPH) Using Methylene Chloride Gas Chromatograph/Flame Ionization Detection, Environmental Research Institute, University of Connecticut, March, 1999

2. Analytical Services Protocol, Volume 1-8, New York State Department of Environmental Conservation, 2003.

3. Annual Book of ASTM Standards. Part 31-Water. American Society for Testing and Materials, Philadelphia, PA, 1981.

4. Chemical Characteristics of Marine Samples, API Publications No. 4307, API, Washington, D. C.

5. Federal Register. Vol. 72, No. 47, March 12, 2007.

6. Methods for the Determination of Inorganic Substances in Environmental Samples (EPA/600/R-93/100).

7. Methods for the Determination of Metals in Environmental Samples, Supplement 1 (EPA/600/R-94/111).

8. Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, 3/83 Revision.

9. The EPA 600 Series. Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater, Appendix A, 40 CFR Part 136, Federal Register, Vol. 49, No. 209, 1984.

10. Methods of Soil Analysis. Part 2, Chemical and Microbiological Properties, Second Edition, American Society of Agronomy, Inc., Soil Science Society of America, Inc., Madison, WI, 1982.

11. Standard Methods for the Examination of Water and Wastewater, 18th Edition, APHA, Washington, D. C., 1992.

12. Standard Methods for the Examination of Water and Wastewater, 20th Edition, APHA, Washington, D. C., 1998.

13. Test Methods for Evaluating Solid Waste-Physical/Chemical Methods, SW-846, 3rd Edition Final Updates I through IV. Office of Solid Waste and Emergency Response, USEPA, Washington, D. C., 1998. Status table found at http://www.epa.gov/epawaste/hazard/testmethods/sw846/pdfs/methstat.pdf

14. USEPA Contract Laboratory Program. Statement of Work for Organic Analysis, USEPA, OLM04.3, OLC03.2, and SOM01.2.

15. USEPA Contract Laboratory Program. Statement of Work for Inorganic Analysis, USEPA ILM05.4, and ISM01.2.

16. Maine Health and Environmental Testing Laboratory. Modified GRO and DRO Methods, Method 4.2.17 and 4.1.25, September 6th 1995.

17. EPA Methods and Guidance for Analysis of Water, Version 2.0. includes MCAWW Methods and most current EPA Methods @ http://www.epa.gov/ost/methods/

11.0 DATA COLLECTION, REDUCTION, VALIDATION AND REPORTING

11.1 Data Collection:

Most of the lab's data is uploaded into the LIMS systems directly from the instruments. The exception is the GC's and GC/MS's in which data is first processed in Target and then uploaded into the LIMS.

Either the instrument analyst or data reporting group will upload the data into the LIMS. The person who performs the upload does a technical review to ensure recoveries of CCVs, MS, MSD, and LCS all seem to be correct. A completeness review is done at this time to ensure all applicable samples have been uploaded for all the necessary analytes.

Next, an employee with a technical background will perform the QA process of the uploaded data. This person is either a supervisor or someone with extensive experience in environmental chemistry. Corrections to the run are made at this step if necessary. When the review is complete, this technical person authorizes the data to be reported by "QA-ing" the run in the LIMS. For a more detailed view of the LIMS uploading/review procedure, see SOP # 110.0028, Data Validation/Self Inspection Procedures.

11.2 Data Reduction:

Instrument printouts, computer terminal displays, chromatograms, strip chart recordings and physical measurements provide raw data that are reduced to concentrations of analytes through the application of the appropriate calculations.

Equations are generally given within the analytical methods referenced in Section 10. Data reduction may be performed automatically by computerized data systems on the instrument, manually by the analyst, or by PCs using verified spreadsheets and/or data base software.

11.3 Data Verification:

The verification process requires the following checks to be made on data before they are submitted to the client:

- A completeness inspection is required which ensures that all required data are included in the data packages submitted to the client and that the appropriate signatures are present on the data packages.
- A contract compliance screening to ensure that contractual requirements have been satisfied.

- A consistency check to ensure that nominally identical or similar data appearing in different places within a data package are consistent with respect to value and units.

- All manual integrations are properly performed and documented.

- A correctness check to ensure that reported data have been calculated correctly or transcribed correctly.

11.4 Data Validation:

Data validation is an essential element of the QA evaluation system. Validation is the process of data review and subsequent acceptance or rejection based on established criteria.

The following analytical criteria are employed by Spectrum Analytical, Inc. RI Division in the technical evaluation of data:

- Accuracy requirements.
- Precision requirements.
- Detection limits requirements.
- Documentation requirements.

As in the case of EPA/CLP procedures, data acceptance limits may be defined within the method. As one means of tracking data acceptability, quality control charts are plotted for specific parameters determined in similar, homogeneous matrices. Control limits for non-CLP methods are statistically determined as analytical results are accumulated unless provided by method or program.

Upon completion of the evaluation, the evaluator dates and initials the data review checklist as described in Section 11.5 below.

11.5 Data Interpretation and Reporting:

Interpretation of raw data and calculation of results are performed by a scientist experienced in the analytical methodology. Upon completion of data reduction, the scientist signs for the reported results on the data review checklist. For GC/ECD, GC/FID and GC/MS, a technical peer review is performed using the data processing software prior to form generation.

The laboratory supervisor is responsible for the data generated in that department. The supervisor or other senior technical staff performs an independent review of data and completed report forms. Members of the QA staff also check the results on selected sets of data (usually 10%).

11.5.1 Report Formats:

Spectrum Analytical, Inc. RI Division uses a flexible data reporting system where final report format is based on the requirements of the client. The two most common types of data reports generated by the Spectrum Analytical Inc., RI Division are Level 2 or "commercial-format" and Level 4 or "CLP-format". The lab adapts its data report format, wherever possible, to meet customer requirements. Occasionally reports are generated that are a compromise between "commercial" and CLP-format deliverables or are designed to meet the needs of a particular regulatory format or sampling program.

Drinking water Metals samples have special reporting requirements and client notification criteria for results exceeding the MCL. Clients are notified via facsimile or e-mail of all samples that exceed any EPA maximum contaminant level (MCL), maximum residual disinfectant level or reportable concentration within 24 hours of obtaining valid data. Drinking water Metals analyses are reported using a custom reporting format that will list the associated MCL and certification status for each element. Additionally, the requirement for the 24 hour MCL exceedence report will be highlighted in the comment section of the Subcontract Work Order for any subcontracted potable water samples.

Commercial data reports are generated using the LIMS. All instrumental analysis data are uploaded from instruments to the LIMS by electronic data transfer. Non-instrumental analysis data or sample preparation data are manually entered into the LIMS. All manual data entry steps are double-checked to insure they are correct, and instrumental data are spot-checked to insure the proper functioning of the data upload system. All data receive a 100% review before they are released to the client as final.

CLP data reports are generated using specialized CLP report modules in the LIMS for all inorganic and most organic analyses. These reports also undergo a 100% review before they are released to the client in their final form.

Records are maintained for all data, even those results that are rejected as invalid.

11.6 Levels of Data Review:

Spectrum Analytical, Inc. RI Division employs five (5) levels of data review. These are based on requirements outlined in several government and other environmental analysis programs including the U. S. Army Corps of Engineers, Air Force Center for Environmental Excellence (AFCEE), Naval Facilities Engineering Service Center (NFESC), HAZWRAP, Department of Defense

ELAP (QSM), EPA Contract Laboratory Program (SOM/ISM), as well as commercial engineering firm programs.

The data review and evaluation process is structured to insure that all data reported to customers has been thoroughly reviewed and approved using a multi-step process designed to identify and correct any error. At any step in the data evaluation and review process, the reviewer has the responsibility and authority to return any data not meeting requirements back to the previous step for re-analysis or correction. No reports are released to the client as final data without successfully passing through each step in the data evaluation and review process. The steps of the data review process are documented, generally using a checklist. Several checklists are used, depending on the type and format of analysis data being reviewed. Any data released prior to the completion of the full review process are released with the statement that the data is preliminary pending final review. The word "Preliminary" is automatically printed on the bottom of all data sheets that are generated prior to completion of data review.

The five levels of data review are detailed in SOP # 110.0028 Data Validation/Self Inspection Procedures. A Flow chart of the data review process follows in Figure 11.6-1.

11.7 Document Control:

All login sheets, Chains-of-Custody (COC) and Sample Condition Forms (SCF) and other sample transmittal documentation are generated in Sample Receiving. A red Workorder File is initiated to contain all workorder-specific hard copy documents. Samples are signed in/out of the sample receiving area by analysts. In the Prep lab, samples and all pertinent information is recorded into logbooks. Once samples are moved to the instrument lab, the transfer of extracts is documented in the electronic transfer logbook (ICOC). In the instrument lab, the analysis of extracts is recorded in the instrument run log. All analysis data, including ICAL, CAL and raw data are acquired using computer-controlled instruments, and stored on the hard drive of the computer performing data acquisition. Data are automatically copied to the company file server after acquisition. Organics analysis data are processed using Thru-Put Systems' Target software. This system creates a folder on the file server for each analysis fraction for each work order or SDG. This folder contains raw data, processed analysis results, instrument tune, initial calibration and continuing calibration results as well as a copy of the data processing method used. This allows for long-term archiving and complete reconstruction of the data at any time in the future. Organic data files are also uploaded into LIMS so reporting forms can be printed. The raw data are printed electronically and arranged with all appropriate sample-preparation and instrument run logbook page copies for technical review.

Inorganic data files are uploaded into LIMS and reporting forms are printed electronically. The original instrument data files and the processed SDG are stored on the file server where they can later be archived by the LIMS Administrator. PDF printouts for reporting forms, instrument data output and all associated preparation logbook page copies are assembled for technical data review through a custom reporting system, Package Maker.

Spectrum RI is primarily utilizing a paperless reporting system with the exception of our EPA CLP reports which require a hard copy report.

See SOP # 110.0029, Electronic Data Management for a detailed description of data management activities used to support laboratory activities.

Following technical review and generation of the report narrative, results go into the workorder file in data reporting. The original copy or electronic pdf version (dependent on client requirements) of the report is sent to the client. Spectrum offers our clients secure access to their pdf reports and EDDs via our website eServices portal. All other information associated with the report, including data review checklists are kept in the red workorder file. The non-reported data (NRD) is scanned into the optical file database for long-term archiving. As documents are scanned into the database they are recorded for permanent storage on hard drives within the fileserver. The archived electronic data is kept for a minimum of ten (10) years or according to contract/program requirements. Prior to the use of the optical file database, hardcopy reports and NRD were shipped to an offsite storage area where they will remain for a minimum of ten (10) years. After this time, these older files will be destroyed.

11.7.1 Logbooks:

All logbooks are issued and controlled by the QA Department. Logbooks are given a unique ID that includes the mm/yy the logbook was printed. Laboratory personnel must sign for the logbook when it has been released by the QA Department. When logbooks are complete, the analyst returns them to the QA Department for archiving unless still needed for reference in the lab. A new logbook is released. The archived logbooks are stored in an on-site storage box for approximately 4-6 months and then are stored in an off-site storage facility or may remain on-site depending on storage space. Refer to SOP # 80.0040, Logbook Use, Review, and Control for more detail. In addition, refer to SOP # 110.0027, Documentation Policy and Procedures for details on Spectrum Analytical, Inc. RI Division's Logbook policies. Logbooks are archived for a minimum of ten (10) years or according to contract/program requirements.

11.7.2 Workorder/Data Files:

Spectrum Analytical, Inc. RI Division is a secured, limited access building. The doors are secured with a keypad entry system. All hard copy information pertaining to the analysis of samples is maintained and stored in a workorder file folder. This information includes all login sheets, COC, SCF, bench sheets and printed analytical data. Electronic data are also stored by laboratory workorder number on the company file server, and in the optical file database of completed reports and NRD as mentioned in section 11.7. File folders containing any remaining workorder information are stored in an off-site storage facility or may remain on-site for a total of 10 years.

The off-site storage facility referred to in the above sections is a locked storage area. Access is limited to the Laboratory Director or his designee and request to retrieve a file will be made to this person.

In the event Spectrum Analytical, Inc. RI Division changes ownership, the maintenance, control, storage and eventual disposal at the end of the appropriate time period, of all records, including client data and QA/QC files, will transfer to the new owners.

In the event Spectrum Analytical, Inc. RI Division decides to cease operations, clients will be notified prior to the cessation of operations and their files/records will be made available to them. Within a designated time period after notification, the client will be responsible for taking custody and the future maintenance of their records. If the client determines they do not want to maintain the records, these will be disposed of properly.

11.7.3 Standard Operating Procedures (SOPs):

SOPs are prepared by the Lab Supervisor and laboratory personnel in conjunction with the QA Director. The QA Director/Staff downloads a copy of the current SOP to the network at Public on 'Bernoulli'. The SOPs can be found in Q:\QA_SOPs. In addition a .pdf file of the SOP is located in Q:\QA_PUBLIC\PDF-MITKEM SOPs. A list of the current SOPs in use at Spectrum Analytical, Inc. RI Division is given in Figure 11.7-1.

The laboratory staff revises the SOPs by making changes to the document that is then reviewed by the department supervisor only if the supervisor is not the party responsible for the revisions. Any additional changes are made at this point.

The QA Department is notified that revisions are completed. The QA Director/Staff moves the revised copy of the SOP to the QA directory, QA Safety/SOPs Needing QA Revision. The QA Director makes changes to the document to include revision number and date and title clarification, if necessary. Changes from the last revision are clearly marked using 'Track Changes' in Microsoft Word.

The QA Director prints a searchable pdf copy of the SOP. At this time, hard copies of several pages are printed for original signatures of the Laboratory or Technical Director, and the QA Director. The effective date is then added to the SOP and the signed pages are scanned and inserted into the pdf document. If an older version of the SOP exists, it is moved to its archive location. The new version will be moved into the Spectrum Analytical, Inc. RI Division Intranet SOP Database as the only version accessible by laboratory personnel. Each analyst who performs any duties related to the SOP must review the new version and enter electronically that he or she has read and understands the material there.

SOP review/revisions occur on an annual basis. The procedure for preparing, reviewing, approving, revising and distributing SOPs as well as the SOP Revision Schedule are described in SOP No. 80.0012.

Minor changes to the SOP between revision dates can be done as needed. Minor changes are recorded in the Revision Record that is a part of the master copy. Edits are clearly marked. This allows readers quick access to the changes.

11.7.4 Quality Assurance Manual:

The lab will review the QA Manual annually at a minimum. Past versions of the QA Manual are maintained and archived by the QA Director in the same manner as SOPs. Edits to the QA Manual are made by the QA Director in conjunction with the laboratory management. Spectrum Analytical, Inc. RI Division will amend the QAP and any affected SOPs within 14 days when technical changes (or any of the circumstances outlined in the USEPA SOW for SOM or ISM, Exhibit E, section 5.3.2) occur. The revised QAP with visible markups will be sent to the USEPA as per section 5.3.2.1.

11.7.5 Method Updates:

In most cases it is the laboratory's policy to implement new revisions of frequently used methods within six months of the date the method revision is promulgated or published as a final method (non-CLP methods, for CLP methods see below). The QA Director, Deputy Director for Quality Services, Technical Director and Laboratory Director make the final decision on when a method revision will be adopted by the laboratory. Additionally, if a client specifically requests or mandates that an "older" method, Spectrum Analytical, Inc. RI Division will advise the client that it is not the most recent method. If the client still insists upon the older method, the lab will comply and make a note in the narrative.

When the laboratory is in the middle of a client's project, the lab will continue using the same revision for the entire sampling event unless advised otherwise by the client. Consequently, once the laboratory has formally adopted a new method revision, both the old and new revision may be in use at the same time, depending on the project.

If a client should not specify which methods to be used, the methods employed by the laboratory shall be fully documented and validated. Additionally, the methods shall be published in a reputable technical journal or text or by a reputable technical organization or instrument manufacturer.

Revisions to USEPA CLP methods are required to be implemented within 14 days of notification when the EPA modifies the technical requirements of the statement of work, or the contract. At this same time, the QAP will be amended as necessary as noted in section 11.7.4.

Laboratory-developed methods can be used as long as they have been documented and validated by qualified personnel. In all cases the client should be notified.

Figure 11.6-1
Data Review Flow Diagram

Spectrum Analytical, Inc. RI Division
Review Process Flow Diagram

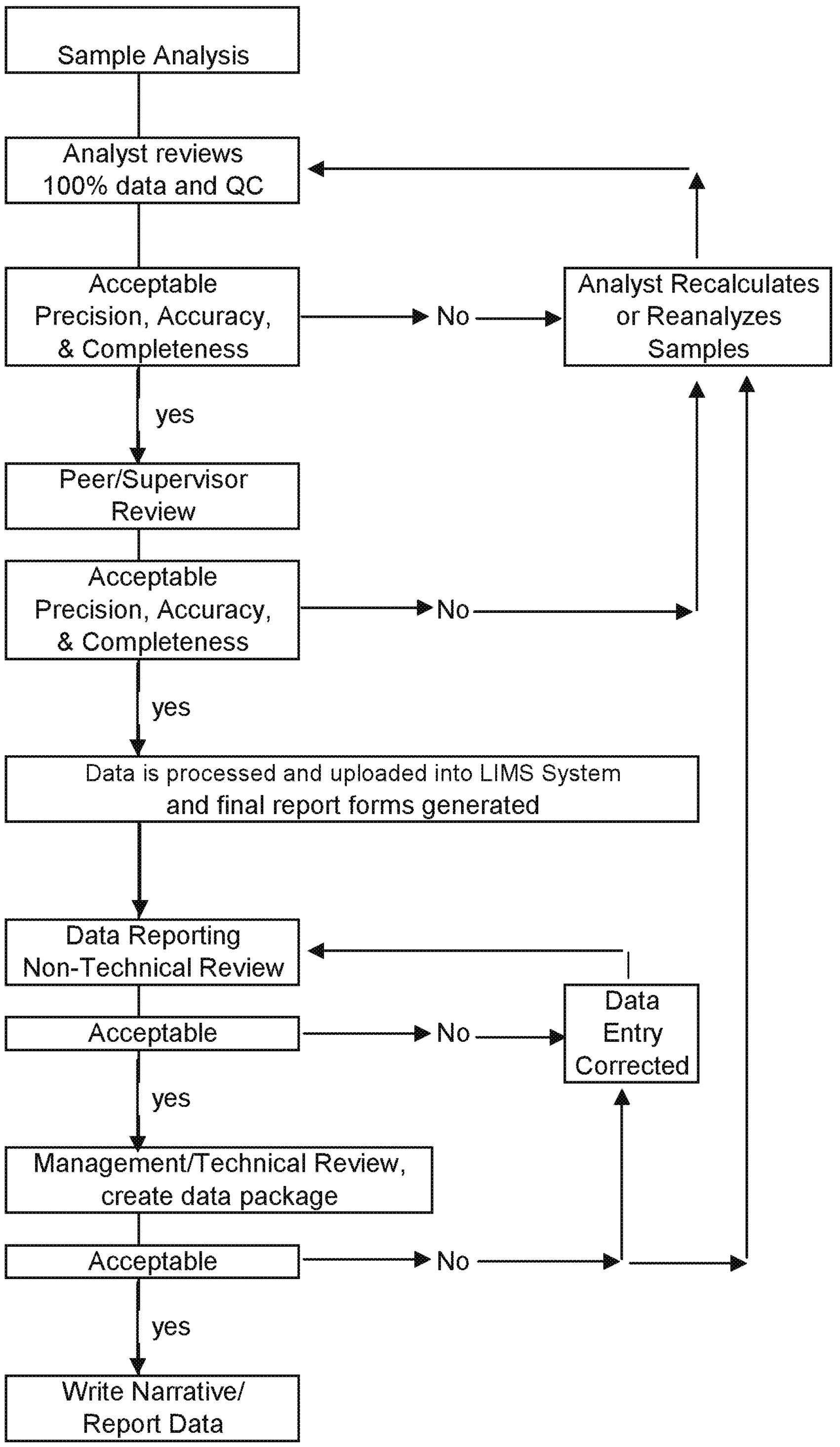


Figure 11.7-1
Standard Operating Procedures (SOPs)

Spectrum Analytical, Inc. Rhode Island Division
Standard Operating Procedures (SOPs)
Master List

SOP #	Title
10.0016	Assembly of Inorganic CLP and CLP-type Reports
10.0017	Assembly of Organic CLP and CLP-type Reports
10.0018	Assembly of Commercial Data Reports
10.0021	Data Report Options
10.0036	EPA/SOM Organic Data PDF Bookmarking
10.0037	EPA/ISM Inorganic Data PDF Bookmarking
20.0003	Logging Workorders into Omega
20.0005	Level 2 LIMS report preparation
30.0002	Bottle order preparation
30.0003	Sample Receipt, Storage, Tracking and Disposal
30.0024	Sample and Waste Disposal
30.0030	ICOC Procedures using IntCOC program
50.0004	Glassware Cleaning - Organics
50.0027	Organic Preparation of Aqueous/Soil Samples for Chlorinated Herbicides by SW-846 Method 8151A
50.0030	SOM01.2 Sulfur Cleanup
50.0031	SW-846 Method 3665A Acid Cleanup
50.0032	Gel Permeation Chromatography by SW-846 Method 3640A
50.0033	SW-846 Method 3620B Florisil Cleanup
50.0034	SW-846 Method 3630C Silica Gel Cleanup
50.0035	Oil&Grease (HEM&SGT) by Method 1664 Revision A
50.0036	SW-846 Method 3660B Sulfur Cleanup

Spectrum Analytical, Inc. Rhode Island Division
Standard Operating Procedures (SOPs)
Master List

SOP #	Title
50.0050	Organic Preparation of Aqueous Samples by Continuous Liquid-Liquid (Method 3520)
50.0051	Organic Preparation of Aqueous Samples by Separatory Funnel (Method 3510)
50.0052	Organic Preparation of Soil Samples by Sonication (Method 3550)
50.0053	Organic Preparation of Soil Samples by Soxhlet (Method 3540)
50.0054	Organic Extract Filtration and Concentration Techniques
50.0060	Organic Preparation of Aqueous Samples by Continuous Liquid-Liquid for Pesticides/Aroclors for SOM01.2
50.0061	Organic Preparation of Aqueous Samples by Separatory Funnel for Pesticides/Aroclors for SOM01.2
50.0062	Organic Preparation of Solid Samples by Sonication for Pesticides/Aroclors for SOM01.2 by Method 3550B
50.0063	Organic Preparation of Aqueous Samples by Continuous Liquid-Liquid for Semivolatiles for SOM01.2
50.0064	Organic Preparation of Solid Samples by Sonication for Semivolatiles for SOM01.2
50.0100	Preparation of Soil Samples by MSE by Method 3570
50.0101	Preparation of Soil Samples by PFE by Method 3545
50.0102	Percent Lipid Determination in Tissue Samples
60.0002	Pesticide/PCB Analysis by EPA Method 608
60.0003	Determination of Polychlorinated Biphenyls by Gas Chromatography/Electron Capture Detector Analysis by SW846 Method 8082A
60.0006	Determination of Pesticides by Gas Chromatography/Electron Capture Detector Analysis by SW846 Method 8081B
60.0007	EDB/DBCP by EPA Method 504.1 and SW-846 8011

Spectrum Analytical, Inc. Rhode Island Division

Standard Operating Procedures (SOPs)

Master List

SOP #	Title
60.0034	Determination of Chlorinated Herbicides by Gas Chromatography/Electron Capture Detector Analysis by
60.0048	Aroclor Analysis GC/ECD by USEPA SOW SOM01.2
60.0049	Pesticide Analysis GC/ECD by USEPA SOW SOM01.2
60.0050	Total Petroleum Hydrocarbons by GC-FID using EPA SW-846 Methods 8015/State Methods
60.0053	PCB Congeners by SW-846 Method 8082 (MOD)
60.0054	PCB Homologs by E680 GC/MS SIMS (MOD)
70.0011	Determination of Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS) Analysis by SW846 Method 8270D
70.0030	Screeening for Semivolatile Organic Analysis by Gas Chromatography/Mass Spectrometry for SOM01.2
70.0033	SIM Analysis by GC/MS (Modified EPA Method 8270D)
70.0035	Semivolatile Organic Analysis by SIM Gas Chromatography/Mass Spectrometry for SOM01.2
70.0048	Semivolatile Organic Analysis by Gas Chromatography/Mass Spectrometry for SOM01.2
70.0051	Semivolatile Organics by GC/MS for Aqueous Samples by EPA Method 625
80.0001	Standard Equivalency/Traceability
80.0002	Client Complaint Policies
80.0004	QA Data Pkg Review
80.0005	Method Detection Limit Determination
80.0006	Internal Audit Procedures
80.0007	Corrective Action Procedures

Spectrum Analytical, Inc. Rhode Island Division

Standard Operating Procedures (SOPs)

Master List

SOP #	Title
80.0009	Newly Implemented Methods (Demonstration of Acceptable Performance)
80.0010	Control Chart Generation and Use
80.0012	The Production of Standard Operating Procedure
80.0013	Reagent Purchasing & tracking
80.0016	Training Procedures and Tracking
80.0020	Temperature Monitoring Systems
80.0030	Labware Volume Verification
80.0040	Logbook Use, Review, and Control
80.0050	Performance Testing Procedures
90.0012	Determination of Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS) Analysis by SW846 Method 8260C
90.0035	Low/Med Volatile OrganicsAnalysis GC/MS by USEPA SOM01.2
90.0036	Trace Volatile OrganicsAnalysis GC/MS for USEPA SOM01.2
90.0038	Gasoline Range Organics by GC/FID using Methods SW-846 8015 and Maine 4.2.17
90.0040	Trace Volatile OrganicsAnalysis GC/MS using SIM for USEPA SOM01.2
90.0052	Volatile Organics by GC/MS for Aqueous Samples by EPA Method 624
90.0060	Methane, Ethane, and Ethene by GC/FID Method RSKSOP-175
100.0001	Glassware Cleaning - Inorganics
100.0002	Alkalinity (by Standard Method 2320)
100.0003	Sample Preparation of Aqueous Samples by Acid Digestion ICP (3005/3010)
100.0004	Total Cyanide by Automated Colorimetric with Midi-distillation by SW846 9012B

Spectrum Analytical, Inc. Rhode Island Division

Standard Operating Procedures (SOPs)

Master List

SOP #	Title
100.0005	Determination of Metals and Trace Elements in Water and Waste by ICP - Atomic Emission Spectrometry by EPA Method 200.7
100.0006	ICAP 3000XL/4300DV Operation
100.0007	Aqueous sample Prep E200.8
100.0010	Nitrite Analysis by Standard Method 4500-NO2 B
100.0011	pH Value by Standard Methods 4500-H+ B
100.0012	Mercury Analysis in Aqueous Samples by Flow Injection Analysis System for Atomic Analysis by Method 7470A/7471B
100.0013	Total and Ortho Phosphate using Ascorbic Acid Method by Standard Method 4500-P E
100.0014	Mercury (Manual Cold Vapor Technique) by EPA Method 245.1
100.0015	The Preparation of Waste Samples for reactive Cyanide and Sulfide; Determination of Reactive Cyanide by Automated Colorimetric Method and Reactive Sulfide by Spectrophotometric Method SW-846 Methods 7.3.3.2 and 7.3.4.2
100.0016	Preparation of Soil Samples for Sulfide Analysis by Modified SW-846 Method 9031
100.0017	Inorganic Analysis of Sulfates in Aqueous Samples by SM 426 C 15th Ed and SM4500 SO4 E-.
100.0018	Inorganic Analysis of Sulfides in Aqueous Samples (Methylene blue method)
100.0019	Total Dissolved Solids Dried at 180°C by Standard Method 2540 C
100.0020	Total Solids Dried at 103-105°C by Standard Method 2540 B
100.0021	Total Suspended Solids Dried at 103-105°C by Standard Method 2540 D
100.0022	TKN Distillation and Determination by Manual Spectrophotometric Analysis by Standard Method 4500-N
100.0023	Color Analysis by Visual Comparison by Modified Standard Methods 2120B
100.0024	Flashpoint Analysis by SW846 Method 1010A
100.0025	Total Organic Carbon by Methods SW-846 9060A and SM5310B

Spectrum Analytical, Inc. Rhode Island Division

Standard Operating Procedures (SOPs)

Master List

SOP #	Title
100.0026	Settleable Solids by Standard Method 2540 F
100.0027	Paint Filter Liquids Test by SW-846 Method 9095A
100.0028	Carbon Dioxide (CO2) and Forms of Alkalinity by Calculation by Standard Method 4500-CO2 D
100.0029	Ferrous Iron Analysis by Standard Method 3500-Fe B, Phenanthroline Method
100.0030	Phenols Analysis by EPA Method 420.1 and Standard Method 5530 B & D, Cleanup and Direct Photometric Method
100.0032	Total Volatile Solids for Solids by SM 2540 E, E160.4; Fixed and Volatile Solids Ignited at 550 C
100.0033	Total Cyanide by Auto-Colorimetric with Midi-Distillation by EPA Method 335.4
100.0053	ISM01.3 ICP-AES Analysis
100.0054	ISM01.3 ICP-MS Analysis
100.0055	Mercury Preparation and Analysis by ISM01.3
100.0056	Cyanide Preparation and Analysis by ISM01.3
100.0100	Sample Preparation of Soils by Acid Digestion for ICP/MS (3050B/6020A)
100.0103	AVS and SEM
100.0104	Sample Preparation of Soils by Acid Digestion for ICP/AES (3050B/6010C)
100.0106	Chemical Oxygen Demand Determination SM5220D
100.0110	Determination of Metals in Water and Wastes by Inductively Coupled Argon Plasma Mass Spectrometry by SW846 Method 6020A
100.0111	Determination of Metals in Water and Wastes by Inductively Coupled Argon Plasma Atomic Emission Spectrometry by SW846 Method 6010C
100.0112	pH in Soil Samples by SW846 9045D/SOM1.2
100.0113	Determination of Metals and Trace Elements in Water by ICP - MS by EPA Method 200.8
100.0121	ICP Aqueous Preparation by ISM01.3

Spectrum Analytical, Inc. Rhode Island Division

Standard Operating Procedures (SOPs)

Master List

SOP #	Title
100.0122	Prep of Soil, Wipe/Air Filter for ICP Analysis by ISM01.3
100.0201	Ammonia Distillation & Determination SM4500-NH3 B&C
100.0208	Inorganic Analysis of Hexavalent Chromium in Soil Samples by SW846 Methods 3060A & 7196A
100.0209	Mercury Speciation…SW846 Method 3200
100.0308	Inorganic Analysis of Hexavalent Chromium in Aqueous Samples by SM 3500 Cr +6 B
100.0400	Inorganic Anions by IC EPA 300.0 and 9056A
100.0410	TOC in Soil by Lloyd-Kahn and SW-846 9060
100.0420	Volatile Fatty Acids by IC using EPA 300.0 (modified)
100.0430	Walkley Black TOC in Soil
100.0440	Total, Fixed and Volatile Solids in solid/semisolid samples by SM2540G
110.0006	Thermometer Calibration
110.0007	Balance Calibration
110.0008	Manual Integration of GC, IC and GC/MS Chromatograms
110.0012	Laboratory Security
110.0013	North Carolina Samples
110.0021	Bids and Proposals
110.0023	Project Management
110.0025	Toxicity Characteristic Leaching Procedure by SW846 Method 1311
110.0026	Handling of Evidentiary Materials
110.0027	Documentation Policy and Procedures
110.0028	Data Validation-Self Inspection Procedures
110.0029	Electronic Data Management
110.0031	Synthetic Precipitation Leaching Procedure by SW-846 Method 1312
110.0032	ASTM Leachate Procedure D3987-06

Spectrum Analytical, Inc. Rhode Island Division
Standard Operating Procedures (SOPs)
Master List

SOP #	Title
110.0034	Sample Data Control for Inorganic CLP (ILM/ISM)
110.0035	Sample Data Control for Organic CLP (SOM)
110.0038	Percent Solids Determination as Required for Various SW-846 and EPA Methods
110.0039	Sub-Sampling for Soil and Solid Samples
110.0040	Instrument Maintenance
110.0041	Multiple Extraction Procedure by SW846 EPA Method 1320
110.0043	Standard Elutriate Preparation
110.0060	Tissue Sample Preparation

12.0 LABORATORY QUALITY CONTROL CHECKS

Spectrum Analytical, Inc. RI Division's analytical procedures are based on sound quality control methodology, which derives from three primary sources:

1. Specific EPA and other approved analytical methods, and

2. "Handbook for Analytical Quality Control in Water and Wastewater Laboratories" (EPA 600/4-79-019).

3. Standards for Good Laboratory Practice.

In the application of established analytical procedures Spectrum Analytical, Inc. RI Division employs, at a minimum, the QC protocols described in the references found in the Analytical Methods section of this document. Specific projects may require additional quality control measures, due to such factors as difficult sample matrices or use of innovative techniques. For those projects Spectrum Analytical, Inc. RI Division will recommend and implement, subject to client approval, QC measures to produce data of known quality.

Each of the Spectrum Analytical, Inc. RI Division laboratory departments have an individual QC program, which includes, but is not limited to, the practices described below.

12.1 Method Detection Limit Determination/Verification:

Method Detection Limits are developed annually for certain inorganic and many organic analyses. Per NELAC Standards, MDLs are not required where target analytes are not reported below the lowest calibration standard concentration. For these analyses, results are only reported within the calibration range, and MDLs are not appropriate or needed. The reporting limit for these compounds is the concentration of the lowest standard in the calibration. For certain inorganic analyses and most organic analyses, Spectrum Analytical, Inc. RI Division typically reports analytes below the lowest level of the calibration range, but above the MDL, as estimated and are qualified with the "J" flag. Spectrum Analytical, Inc. RI Division reports estimated values below the calibration range for those analyses where results are able to be confirmed as in dual column confirmation, or by two concurrent determinative tests such as retention time and mass spectra as in GC/MS analyses. For these analyses MDLs are determined or verified annually, depending on program requirements.

MDLs are determined for all test methods where required by specific program or state regulations. Methods analyzed for the State of Massachusetts which do not detail MDL requirements within the published method, require preparation and analysis of the MDL samples over a minimum of three days. This is believed to better mirror real world samples and day to day variability of preparatory and analytical steps.

In addition, to address special project requirements, MDLs can be determined for those tests which are not routinely reported below calibration range. If a client requests results to be reported below the calibration range without an MDL study, this is clearly identified in the workorder narrative.

Following an MDL study, the determined limits are verified by the analysis of an MDL Verification Standard. This standard is analyzed at approximately 2 to 3 times the calculated MDL for single analyte tests or 1-4 times the calculated MDL for tests with multiple analytes. This spike concentration is also referred to as the Limit of Detection in Department of Defense Quality Systems Manual (DoD QSM). DoD QSM requires quarterly verification of the LOD. For more details refer to SOP 80.0005 Determination of Method Detection Limits.

12.2 Personnel Training:

Chemists who begin their employment at Spectrum Analytical, Inc. RI Division are to be instructed under the lab's Safety Training Program within the first month. The Safety Training Program includes laboratory basics, safety video and testing, and MSDS instruction.

Before performing any analyses, a chemist is required to read the appropriate protocols and SOPs. The chemist is required to sign off on all documents read in the electronic SOP database located on our lab Intranet.

The new analyst must become familiar with the laboratory equipment and the analytical methods, and begins a training period during which he or she works under strict supervision. Independent work is only permitted after the chemist successfully completes an accuracy and precision study.

The accuracy and precision study is also commonly referred to as a Demonstration of Capability exercise. Upon the successful completion of the Initial Demonstration of Capability exercise, the QA Department issues a Demonstration of Capability Certificate (IDOC) which is signed by both the QA Director and Laboratory Director.

Demonstration of Capability studies requires the acceptable mean recovery of 4 LCS samples for each matrix or the acceptable analysis of a blind spike sample such as a Performance evaluation sample. Acceptance limits are established by the method. It is necessary to pass the study whether for extraction and/or analysis.

Annually thereafter the employee must perform an acceptable demonstration of capability study to document continued acceptable performance in his/her particular preparatory or analytical method specialty. This is referred to as the On-going DOC. All DOCC documentation is filed in the employee's personnel folder, which is stored in the QA Department/or in the electronic personnel folder as the system has transitioned to a paperless filing system for DOCC.

Initial and on-going personnel training include data integrity training. The 4 required elements of the data integrity system include: 1) data integrity training, 2) signed data integrity documentation, 3) in-depth, periodic monitoring of data integrity, and 4) data integrity procedure documentation.

Data integrity training topics will include the need for honesty and full disclosure in all analytical reporting, how and when to report integrity issues and what those issues could be. Employees will understand that infractions of data integrity procedures can result in an investigation that could lead to serious consequences which include immediate termination, and civil or criminal prosecution. At the start of employment all new employees read, discuss and sign a Confidentiality, Ethics and Data Integrity Agreement. Annually, an on-going integrity training session is held. An attendance sheet will be generated for every integrity session. These sheets are filed in the QA Office under "Training". Another option for the annual training session is having all staff review refresher materials online and documents their having done so. This is done within the framework of the SOP database on the lab's intranet.

Data integrity procedures are reviewed and updated annually by senior management.

Training for the EPA Statement of Work occurs according to the above requirements. In addition, analysts are required to read the CLP Statement of Work as a part of the documentation training.

12.3 Control Charts:

For organic and inorganic analyses, the recoveries of analytes in the lab control samples are plotted on control charts. These charts are used to establish control and warning limits.

12.3.1 Control limits are calculated ,compared, and/or updated at least annually from the LCS, MS/MSD, and Surrogate data points for each analyte and matrix using the following equations:

$$Average(\overline{x}) = \frac{\left[\sum_{i=1}^{n} x_i\right]}{n}$$

$$SD = \sqrt{\frac{\sum_{i=1}^{n} \left(x_i - \overline{x}\right)^2}{n-1}}$$

In which:
SD = Standard Deviation
N = number of data points

Warning Limits = Average ± 2 * SD

Control Limits = Average ± 3 * SD

12.3.2 Control limits must be approved by the QA Director and by the Laboratory Director prior to adoption by the laboratory. In the event that limits are wider than method recommended limits, the method recommended limits may be adopted and the analytical procedure will be re-evaluated and/or re-determined to identify possible causes. Additionally, in the event that control limits are tighter than 15% from the average, the lab may adopt a control limit of ±15% from the average. If in the experience of the laboratory, statistical control limits are unreasonably wide or narrow, alternative limits may be used until appropriate statistical limits are developed. Alternative limits are based on sources such as DoD QSM published guidelines, EPA limits from the specific test method or from similar methods, laboratory experience with the method or other sources.

12.3.3 Control charts are plotted in EXCEL using the LIMS system.

Data from each laboratory is uploaded into the LIMS. The compounds, recoveries, and date analyzed for each test are recorded in the system. In order for LIMS generated control limits to be valid, all data, including data not meeting existing recovery criteria, must be uploaded. A control chart is then printed for review by the QA Director and by the Lab Supervisor. Out of control situations noted on the control chart are discussed with the Supervisor or Laboratory Director by the QA Director.

An example control chart is presented as Figure 12.3-1. LCS data must be reviewed and evaluated daily against the Control Limits to establish that the system is in control.

12.3.4 The following situations constitute an out of control situation on a control chart:

- One data point above or below the Control Limit line.
- Two consecutive data points above or below the Warning Limit line.
- Six or more consecutive data points above the Average Line or six or more consecutive data points below the Average Line. This situation suggests a trend and suggests the procedure has been changed in some way (for better or worse). The cause for this trend must be investigated.

12.4 General QC Protocols:

12.4.1. Organics Laboratory:

- Trip blanks and holding blanks, when applicable, are analyzed to detect contamination during sample shipping, handling and storage.
- Method blanks, at a minimum of one in every 20 samples, are analyzed to detect contamination during analysis.
- Volatile organic method blanks are analyzed once during each analytical sequence.
- One blank spike (Laboratory Control Sample or LCS) consisting of an analytical sample of laboratory water, anhydrous sodium sulfate, or Ottawa sand with every batch of 20 or fewer samples, is analyzed to determine accuracy.
- Sample spikes and spike duplicates, as requested, are analyzed to determine accuracy and the presence of matrix effects. The Relative Percent Difference (RPD) is also determined for matrix spike/matrix spike duplicates to measure precision. The criteria followed are stated in the individual methods. For batches without a sample duplicate (for example, if insufficient sample volume is provided), a duplicate blank spike (LCSD) is performed to provide for precision measurement.

- Performance evaluation samples from EPA and state agencies are analyzed to verify continuing compliance with EPA and NELAC QA/QC standards.

- Surrogate standards are added to samples and calculations of surrogate recoveries are performed to determine matrix effect and extraction efficiency.

- Internal standards for GC/MS analysis are added to sample extracts to account for sample-to-sample variation.

- Analysis of EPA traceable standards (ICV) to verify working standard accuracy and instrument performance.

- Initial multi-level calibrations are performed to establish calibration curves.

- Instrument calibration is established or verified with every analytical sequence.

- Tuning of GC/MS systems once every 12 hours for CLP and SW-846 methods or 24 hours for methods 624/625 to method specifications is implemented for consistency in data generation.

- Quarterly analysis of LOD and/or LOQ check samples to verify low level detection and reporting limits for Department of Defense QSM programs.

- Annual Verification of MDL for NELAC/TNI.

When QC limits are not met during an analytical run, the source of the problem must be investigated. Following an evaluation of the data, those samples affected must be re-analyzed after the problem has been solved. If QC limits continue to be out of control, the instrument must be checked and/or a service call made and/or further corrective action implemented.

12.4.2. Inorganic Laboratory:

- Trip blanks are analyzed when applicable, to detect contamination during sample shipping, handling and storage.

- Method blanks are analyzed at a minimum of one every 20 samples, to detect contamination during analysis.

- One matrix spike of an analytical sample or laboratory water or soil is made and spike recoveries are calculated with every batch up to 20 samples to determine accuracy. Duplicate samples are analyzed and the RPD between the sample and duplicate is calculated for every batch up to 20 samples. If insufficient volume of sample is received, a note is made in the appropriate preparation logbook.

- Performance evaluation samples from EPA and state agencies are analyzed to verify continuing compliance with EPA and NELAC QA/QC standards.

- Metals analysis instruments are calibrated for every analytical run.

- Analysis of EPA traceable standards (ICV) to verify working standard accuracy and instrument performance.

- QC/LCS checks samples are analyzed during every analytical batch of up to20 samples in order to document accuracy.

- Quarterly analysis of LOD and LOQ check samples to verify low level detection and reporting limits for Department of Defense QSM programs.

- Annual Verification of MDL for NELAC/TNI.

When QC limits are not met during an analytical run, the source of the problem must be investigated. Following an evaluation of the data, those samples affected must be re-analyzed after the problem has been solved. If QC limits continue to be out of control, the instrument must be checked and/or a service call made and/or further corrective action implemented.

12.5. Lab Pure Water used for method blanks and dilutions:

Spectrum Analytical, Inc. RI Division uses several systems to generate analyte-free water for use in the laboratory. These systems generate high quality, analyte free water dedicated to the needs of specific analyses.

12.5.1. For inorganic analyses the wet chemistry and metals labs use a US Filter mixed-bed deionization system followed by particle and carbon filters. This is followed by a polishing system using Barnstead E-Pure cartridges optimized for removal of inorganic constituents. Purity is monitored using an in-line electrical resistivity meter with integral cell. Finished Inorganic reagent water is tested for conductance on a routine basis (at least annually), through the use of an external conductivity meter.

12.5.2. For organic analyses, the extractable organics laboratory uses a Barnstead E-Pure system optimized for removal of organic constituents. As organic contaminants are not measured by a resistivity meter, this is not a relied-upon method to monitor the quality of organic analyte-free water. Instead, laboratory method blanks are used, typically several per working day, to monitor the acceptability of the water for its intended use. Any analyte detected above (half of) the reporting limit is investigated. If this can be traced to the water purification system as its source, maintenance is performed on the water purification system. The volatile organics laboratory uses a Whirlpool Model WHER25 Reverse Osmosis Drinking water system to provide analyte free water.

Figure 12.3-1
Example Control Chart

Spectrum Analytical, Inc. Featuring Hanibal Technology

REC QUALITY CONTROL CHART

Date: *24-Sep-12*

Test Code: SW8081_W **Analyte:** 4,4´-DDD

SampType	Sample ID	Analysis Date	Batch ID	Low Limit	High Limit	% Recovery
LCSD	LCSD-65227	3/23/2012	65227	25	150	94.0
LCS	LCS-65227	3/23/2012	65227	25	150	88.6
LCS	LCS-65354	4/3/2012	65354	25	150	93.9
LCS	LCS-65320	4/3/2012	65320	25	150	91.4
LCSD	LCSD-65320	4/3/2012	65320	25	150	84.5
LCS	LCS-65743	4/26/2012	65743	25	150	92.8
LCS	LCS-65925	5/7/2012	65925	25	150	91.6
LCS	LCS-66030	5/14/2012	66030	25	150	75.4
LCS	LCS-66116	5/15/2012	66116	25	150	93.2
LCSD	LCSD-66116	5/15/2012	66116	25	150	92.7
LCS	LCS-66132	5/16/2012	66132	25	150	92.8
LCS	LCS-66631	6/12/2012	66631	25	150	94.4
LCSD	LCSD-66631	6/12/2012	66631	25	150	99.1
LCS	LCS-66758	6/18/2012	66758	25	150	90.8
LCSD	LCSD-66767	6/18/2012	66767	25	150	82.5
LCSD	LCSD-66758	6/18/2012	66758	25	150	79.9
LCS	LCS-66767	6/18/2012	66767	25	150	89.5
LCS	LCS-66817	6/19/2012	66817	25	150	92.8
LCSD	LCSD-66817	6/19/2012	66817	25	150	92.6
LCS	LCS-66801	6/20/2012	66801	25	150	99.0
LCSD	LCSD-66801	6/20/2012	66801	25	150	98.6
LCS	LCS-66899	6/28/2012	66899	25	150	80.5
LCSD	LCSD-66899	6/28/2012	66899	25	150	83.1
LCSD	LCSD-67208	7/19/2012	67208	25	150	84.8
LCS	LCS-67208	7/20/2012	67208	25	150	89.5
LCS	LCS-67206	7/20/2012	67206	25	150	80.6
LCS	LCS-68027	9/13/2012	68027	25	150	96.9
LCS	LCS-68082	9/13/2012	68082	25	150	100.3

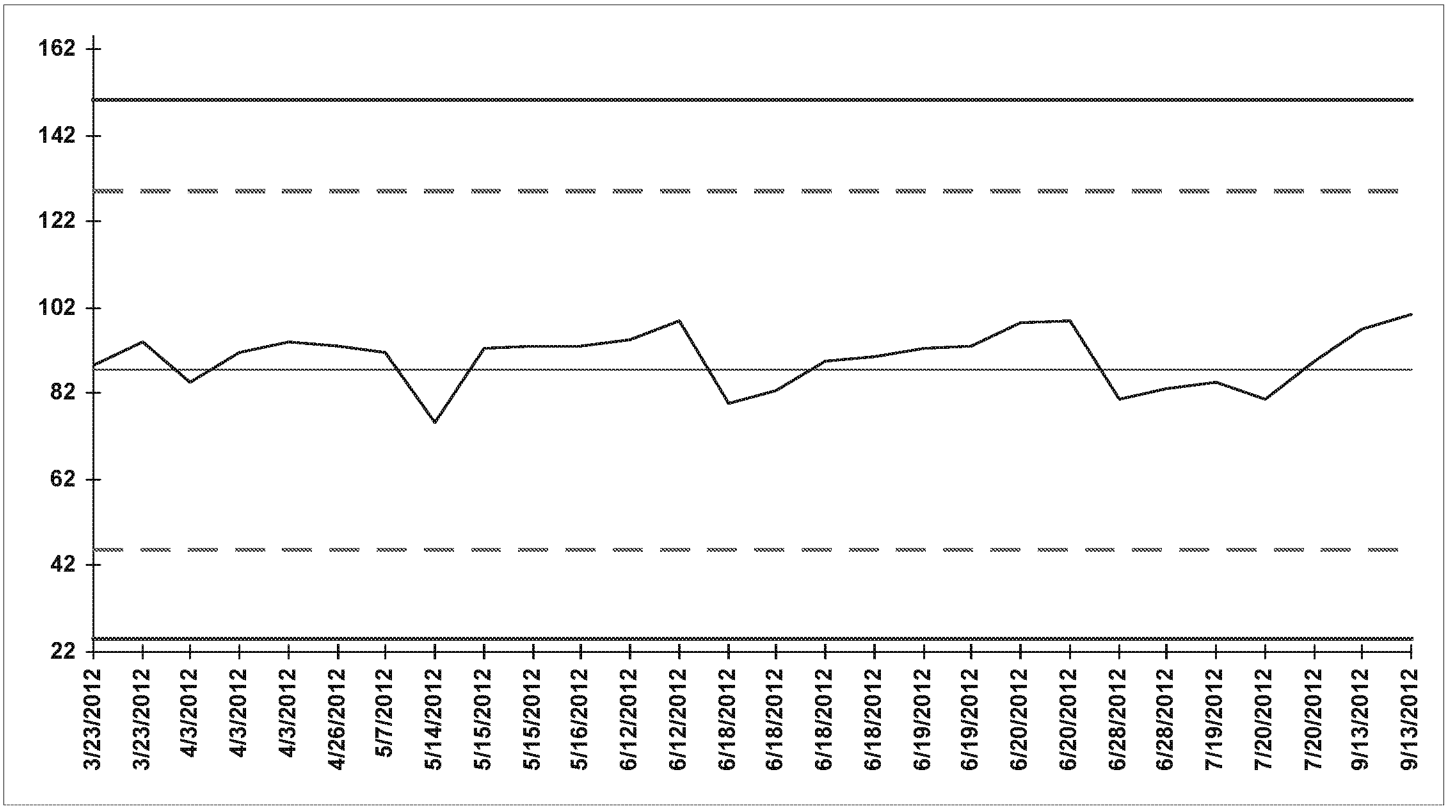
Spectrum Analytical, Inc. Featuring Hanibal Technology

REC QUALITY CONTROL CHART

Date: *24-Sep-12*

Test Code: SW8081_W Analyte: 4,4´-DDD

SampType	Sample ID	Analysis Date	Batch ID	Low Limit	High Limit	% Recovery



13.0 QUALITY ASSURANCE SYSTEMS AUDITS, PERFORMANCE AUDITS AND FREQUENCIES, PEER REVIEW

The Spectrum Analytical, Inc. RI Division Quality Assurance staff performs routine internal audits of the laboratory. The frequency of such audits depends on the workload in house but is done annually, at a minimum. These audits entail reviewing laboratory logbooks and all appropriate operations to ensure that all laboratory systems including sample control, analytical procedures, data generation and documentation meet contractual requirements and comply with good laboratory practices.

13.1 System Audits:

The QA Director audits each individual laboratory annually in order to detect any sample flow, analytical or documentation problems and to ensure adherence to good laboratory practices as described in Spectrum Analytical, Inc. RI Division's Standard Operating Procedures and Quality Assurance Plan. A checklist used in an internal systems audit is presented in Figure 13.1-1.

Areas covered by the internal audit include logbook documentation and review, standard traceability, standard storage and expiration dates, method criteria adherence, instrument maintenance records, SOP review, and knowledge of the analysts. Often, deficiencies that have been noted during "outside" audits will also be reviewed.

Upon the completion of the internal audit, a formal audit report is presented to the laboratory supervisor who is given a specific timeframe to respond in writing to the deficiencies. The QA Department will do a follow up audit to check that at least the major deficiencies have been corrected. The follow-up audit occurs within 30-45 days from the date of the audit response.

13.2 Performance Audits:

Spectrum Analytical, Inc. RI Division participates in external Performance Test (PT) studies under the National Environmental Accreditation Program (NELAP) through the New Jersey Department of Environmental Protection (Primary Accreditation Authority). The QA department administers the Performance Evaluation Samples for Wastewater/Solid Waste (WW/SHW). Additionally, performance samples are administered for test methods not certified through the New Jersey program, such as specific state methods. PT samples are handled (i.e., managed, analyzed, and reported) in the same manner as real environmental samples utilizing the same staff, methods as used for routine analysis of that analyte, procedures, equipment, facilities, and frequency of analysis. When analyzing a PT sample, a laboratory shall employ the same calibration, laboratory quality control and acceptance criteria, sequence of analytical steps, number of replicates and other procedures as used when analyzing routine samples. PT samples are reported electronically via the vendor's website (ERA, RTC…), and results are sent directly to all applicable state or agency certification programs.

Clients also send performance evaluation samples (PES) to Spectrum Analytical, Inc. RI Division as part of their own quality control program. Spectrum Analytical, Inc. RI Division is blind to the true values of the PES. The USEPA CLP program provides quarterly blind (QB) studies for all tests and matrices. The lab is informed of their performance after the study has been graded through an Individual Laboratory Summary Report. When results in any section are less than 90.0%, the lab is required to complete a formal corrective action report to the EPA.

Spectrum Analytical, Inc. RI Division also participates in external electronic data QA monitoring audits and data package audits through the USEPA CLP program. On request, the Spectrum Analytical, Inc. RI Division CLP Project Manager submits instrument data tapes and all applicable documentation for tape audits, including a copy of the data package. All original documentation generated during sample analyses may be requested. The results of the tape audit are sent to Spectrum Analytical, Inc. RI Division in report format in the same manner as an on-site audit (see below). A formal response is required.

Several times a year outside agencies (federal, state, or private) may schedule an audit at Spectrum Analytical, Inc. RI Division in order to check the laboratory's processes. Most often these audits begin and end with a meeting between auditors and laboratory management. Each individual laboratory is examined. The QA Director and/or Senior Management Staff are most likely to remain with the auditors at all times during the audit.

Sometime after the audit, the lab receives a formal audit report to which it must respond. The audit report is initially reviewed by the QA Director who copies and distributes the report to each laboratory supervisor. The supervisors are required to respond in writing to the findings that pertain to his or her department. The QA Officer compiles the formal response that could be tweaked several times before the auditing authority accepts the results. A specific timeframe is set by the individual agency involved.

The QA Officer then sends a memo to each supervisor to detail what needs to be done in each department within a specific timeframe. The QA Department then follows up with the labs to ensure procedures have been modified and the corrective actions are in place.

Internally, performance is monitored on a daily basis at Spectrum Analytical, Inc. RI Division through the use of surrogate and internal standards, and LCS and MS/MSD samples. Check samples from independent commercial sources are employed routinely in each of the Spectrum Analytical, Inc. RI Division laboratory departments and ensure continuing high-level performance. The QA

Director may distribute internal blind PE samples to each laboratory department as needed. These blind PE samples can also be used to show on-going analyst proficiency in lieu of 4 LCS studies.

13.3. Peer Review:

Peer review is used as a vital quality control tool within all areas of the laboratory, and at all levels. Peer review allows defects in the acquisition, evaluation and reporting of sample data to be identified before moving on to the next step in the process of preparing and analyzing samples. Several steps of peer review are included at Spectrum Analytical, Inc. RI Division to prevent and catch mistakes, whether caused by human error or a system malfunction. As soon as samples enter the laboratory they are logged into the LIMS system and given unique sample identifiers that correspond to the client's IDs listed on the chain of custody. The individual jars or bottles are labeled and the technician employs a peer review of this labeling process. A project manager or peer technician visually inspects each jar or bottle for proper identification and matching lab/client IDs. Once the samples are sent into the labs for test preparation, they again undergo peer review as they are set up for extraction, digestion or distillation... This time the samples are inspected to confirm the samples at the bench match the identifications written into the lab preparation logbooks. Once the concentrated extract, digestate or distillate is ready for analysis and set up on the analytical instrument, an analyst will perform another peer review of the autosampler set up to avoid any misplacements of sample vials. In some lab areas this review may occur after instrument analysis, to verify all sample data were acquired electronically. Every analytical instrument sequence (GC/ECD, GC/FID, GC/MS, ICP/MS, ICP/AES, CVAA, FIA, IC) undergoes a technical peer review by a qualified analyst to verify positive and false positive results as well as manual integrations. Data reports are also reviewed at length according to the 5 level review processes described in Section 11 of the QAP as well as in SOP No. 110.0028 Data Validation/Self Inspection Procedures. At each point in the process, the peer review is documented.

Figure 13.1-1
QA Systems Audit Checklist

Quality Assurance Department
Spectrum Analytical, Inc. RI Division

Quality Review of Laboratory Department

Auditor:
Date:

Purpose

The Quality Review is a necessary tool to assess a department's quality and service functions. Each department will undergo a review of their process and procedures to evaluate their needs and areas of possible improvement. Each department will be tracked for quality, safety, compliance, reoccurring errors and process improvement.

Process

Each department will be broken down into several categories or areas of review. Each category will be reviewed and assessed for compliance. The categories will include at a minimum:

Personnel Training and Knowledge
Equipment
SOP Updates and Review
Logbook Review and Control
Chemicals/Standard Storage and Preparation
Sample Procedures and Method Compliance
QA/QC Procedures
Corrective Actions in process

Each category will be reviewed and a listing of any deficiency or findings will be documented for response and correction. The department Supervisor (s) will be required to respond to each deficiency or finding within 30 days of receipt of this report. All deficiencies or findings must have its correction(s) documented. For example, logbook deficiencies will require a photocopy of the correction(s). All other responses will require a written response or adequate explanation. Deficiencies will be tracked for reoccurrence. All documentation should be forward to the QA department for evaluation. A follow up audit may be scheduled.

Findings:

Personnel Training and Knowledge

Equipment

SOP Updates and Review

Logbook Review and Control

Chemicals/Standard Storage and Preparation

Sample Procedures and Method Compliance

QA/QC Procedures

Corrective Actions in process

Items marked with an* asterisk will require a written response by the lab supervisor or his designee to the QA Dept. This response must be submitted to the QA Department by *mm/dd/yyyy*. The response can be entered directly into this document in a different font color. Please note date that the CA was completed.

Auditor ____________________________________ Date ____________________

14.0 PREVENTIVE MAINTENANCE

Preventive maintenance is a routine practice at Spectrum Analytical, Inc. RI Division for all instrumentation. Scheduled preventive maintenance minimizes instrument downtime and subsequent interruption of analysis.

Only those equipment items meeting or exceeding applicable performance requirements are used for data collection. This includes items such as laboratory balances as well as major analytical instruments such as ICPs, ICP/MS, GCs and GC/MSs. All major instrumentation and equipment, as well as backup alternatives, are listed in Appendix A. Spectrum Analytical, Inc. RI Division SOP No. 110.0040, Instrument Maintenance, describes routine maintenance in detail. Individual analytical standard operating procedures describe maintenance as well (See Figure 11.7-1 for SOP listing).
When new software is purchased or developed, it is loaded onto one workstation with copies of data that have been previously processed using older software, and known to be correct. The data is then reprocessed using the new software and then the new results are compared to the original results for defects. If the software was purchased and found to contain a defect, the vendor is contacted and a solution and/or patch are requested. If the software was developed in-house, the problems are identified and corrected. This process is applicable to all software including enhancements made to customize the LIMS and network servers.

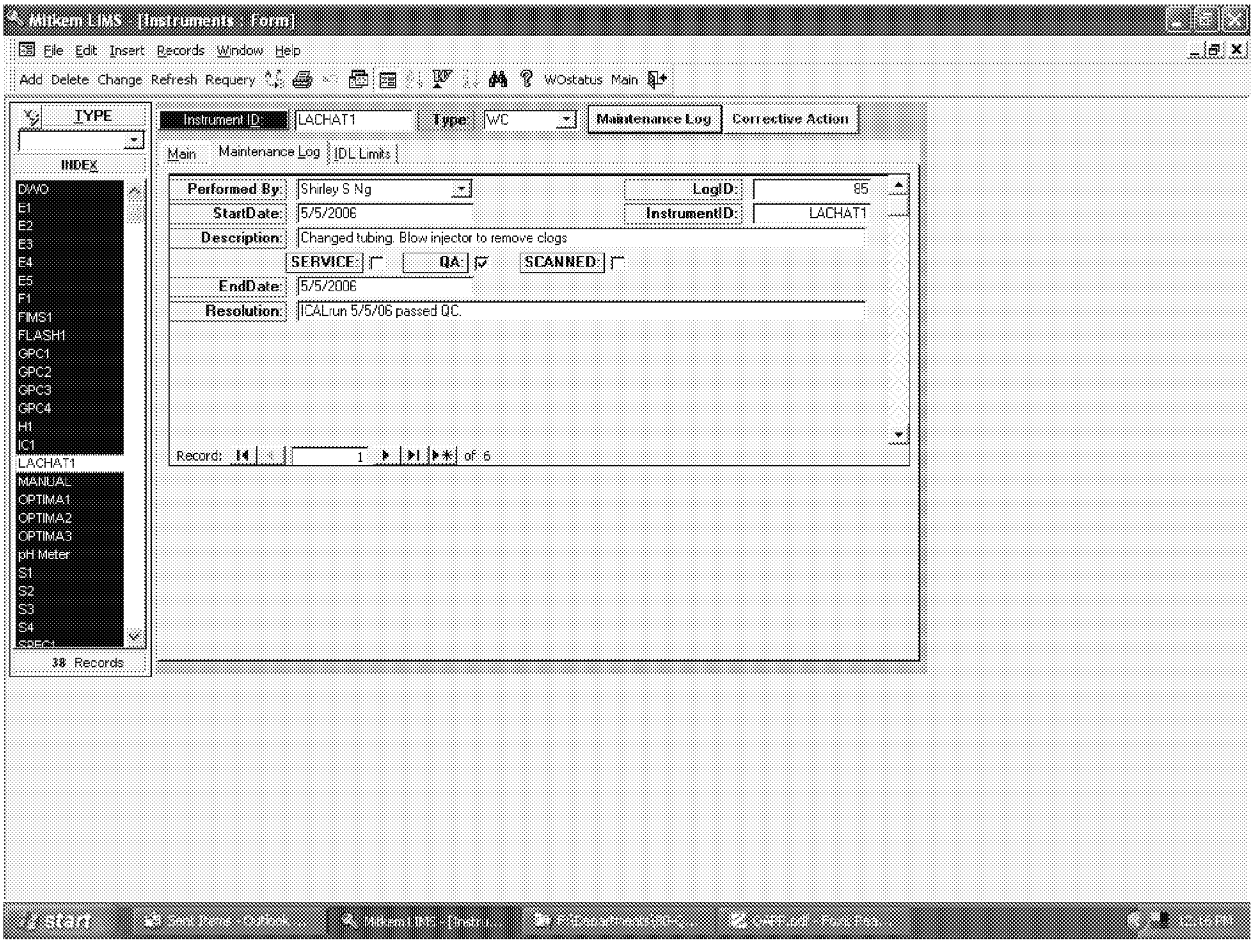
Spectrum Analytical, Inc. RI Division's laboratory personnel are familiar with the routine and non-routine maintenance requirements of the instruments they operate. This familiarity is based on education, hands-on experience and manufacturer's training courses. As needed, major equipment may under-go extensive maintenance or service by a contracted technician.

Instrument maintenance logs are kept for each instrument in the LIMS (figure 14-1). All employees have password protected access to the LIMS. The person performing the maintenance is required to provide the following information in the online log:

- Equipment identifier
- The inspection, maintenance, calibration or corrective action(s) performed.
- The trigger(s) for the maintenance action(s)
- The identity of the person(s) performing the maintenance
- The date on which the work was performed
- The need for a service call
- The condition of the equipment upon completion of the work (may include resolution of problems, date and type of ICAL run or other method of determining that the system is in good working order), and
- The presence of any scanned paperwork associated to the maintenance

Spectrum Analytical, Inc. RI Division maintains an inventory of replacement parts required for preventive maintenance and spare parts that often need replacement, such as filaments for GC/MS systems and the more mundane electrical fuses and GC column ferrules. To control cost, the appropriate supervisor shall decide the types and numbers of spare parts kept on hand for each equipment item.

Figure 14-1



Example of Instrument Maintenance Log

15.0 SPECIFIC ROUTINE PROCEDURES USED TO ASSESS DATA PRECISION, ACCURACY, COMPLETENESS, METHODS DETECTION LIMIT AND LINEAR DYNAMIC RANGE

These mathematical equations represent the means of calculating analytical figures of merit on a routine basis at Spectrum Analytical, Inc. RI Division. However, they may be supplanted with other calculations if requested by the client. Precision, accuracy and completeness are also discussed in Section 6.

15.1 Precision:

Precision is frequently determined by the comparison of replicates, where replicates result from an original sample that has been split for identical analyses. Standard deviations, *s*, of a sample are commonly used in estimating precision.

Sample standard deviation, *s*:

$$s = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2}$$

where a quantity, x_i (e.g. a concentration), is measured n times with a mean, $\bar{x}$.

The relative standard deviation, *RSD* (or sample coefficient of variation, *CV*), which expresses standard deviation as a percentage of the mean, is generally useful in the comparison of three or more replicates (although it may be applied in the case of n = 2).

$$\%RSD = 100\ (s\ /\ \bar{x})$$

or

$$CV = 100\ (s\ /\ \bar{x})$$

In which: *RSD* = relative standard deviation, or
CV = coefficient of variation
s = standard deviation
$\bar{x}$ = mean

For duplicates (samples that result when an original sample have been split into two for identical analyses), the relative percent difference (*RPD*) between the two samples may be used to estimate precision.

$$RPD = \frac{2(D_1 - D_2)}{(D_1 + D_2)} \times 100\%$$

In which: D_1 = first sample value
D_2 = second sample value (duplicate)

15.2 Accuracy:

The determination of accuracy of a measurement requires knowledge of the true or accepted value for the signal being measured. Accuracy may be calculated in terms of bias as follows:

$$Bias = X - T$$

$$\%Bias = 100\frac{(X - T)}{T}$$

In which: X = average observed value of measurement
T = "true" value

Accuracy also may be calculated in terms of the recoveries of analytes in spiked samples:

$$\%\mathrm{Recovery}(\%R) = 100 \times \frac{(SSR - SR)}{SA}$$

where: SSR = spikes sample result
SR = sample result
SA = spike added

15.3 Completeness:

Determine whether a database is complete or incomplete may be quite difficult. To be considered complete, the data set must contain all QC check analyses verifying precision and accuracy for the analytical protocol. Less obvious is whether the data are sufficient to achieve the goals of the project. All data are reviewed in terms of goals in order to determine if the data set is sufficient.

Where possible, the percent completeness for each set of samples is calculated as follows:

$$\%\text{Completeness} = \frac{\text{valid data obtained}}{\text{total data planned}} \times 100$$

15.4 Method Detection Limit:

The method detection limit (MDL) is the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is not zero. It is computed as follows from data obtained by repeatedly determining an analyte in a given sample matrix:

1. Analyze at least seven samples of a homogeneous matrix spike that contains the analyte(s) of interest at concentrations of three to five times the expected MDL. The entire sample preparation and analysis protocol must be applied in each analysis; simply preparing one sample and repeating a measurement three or more times on the sample in not acceptable.

2. Upload the acceptable data into LIMS.

3. The LIMS will compute the standard deviation of the results for each analyte using the following equation:

$$\mathrm{MDL} = t_{(n\text{-}1,\ \alpha=0.99)}\ (s)$$

   Where t is the one-sided student's t value appropriate for the number of samples analyzed, n; α is the statistical confidence level; and s is the standard deviation.

   The one-sided t-values are presented below:

Number of samples	t-value
7	3.14
8	2.996
9	2.90
10	2.82

4. The MDL is then checked against 40CFR136 requirements by the QA Department. If the MDL is acceptable then it is uploaded into the LIMS by either the QA Department or LIMS Administrator.

5. Immediately following the determination of the MDL, MDL check samples are analyzed at a concentration approximately equal to 2-3 x the new MDL for SW846 tests. The analyte of interest must be detected at this concentration, or the raising the MDL may be required. Once the MDL check is acceptable, the detection limit (DL) has been established.

6. An elevated MDL can be uploaded if necessary into the LIMS as long as documentation is available to show that the applicable method can produce an MDL at least that low. This can commonly occur for ICP

analysis in which extremely low MDLs can cause method compliance issues. When appropriate, the MDL study may be prepared and analyzed over several days to increase the variability of the preparation and/or analytical steps.

7. More detail on MDLs can be found in SOP 80.0005 Method Detection Limit Determination.

15.5 Linear Dynamic Range:

The linear dynamic range is the concentration range over which the instrument response is linear. It is determined by analyzing a series of standard solutions that extends beyond the non-linear calibration region at both the low and high extremes, and selecting that range of standards which demonstrates a linear relationship between instrument response and concentration.

For ICP analysis, the linear dynamic range is determined by analyzing each metal at 3 different concentrations. The concentration which produces results within a 10% error is determined to be the linear dynamic range. This procedure must be performed per individual method requirements.

ILM5.4 requires the analysis of the linear dynamic range be determined quarterly, with a 5 % error.

16.0 CORRECTIVE ACTION

An essential element of the QA Program, Corrective Action provides systematic, active measures taken in the resolution of problems and the restoration of analytical systems to their proper functioning.

Corrective actions for laboratory problems are described in Spectrum Analytical, Inc. RI Division's laboratory standard operating procedures (SOP). Personal experience often is most valuable in alerting the bench scientist to questionable results or the malfunctioning of equipment. Specific QC procedures are designed to help the analyst determine the need for corrective actions (see Section 11, Data Reduction, Validation and Reporting). Corrective actions taken by scientists in the laboratory help avoid the collection of poor quality data. The lab's corrective action program divides these issues into routine and non-routine corrective actions as described below.

Routine Corrective Action – A routine corrective action is taken when the out-of-control event encountered is one that is detected at the appropriate level in the QA process. Routine corrective actions are defined in the analytical SOP with specific steps to be taken as corrective action (i.e., low surrogate recovery, continuing calibration verifications, project specific protocols that do not meet acceptance criteria, etc.) Routine corrective actions must be documented as described in the analytical SOP, but do not require further documentation in the corrective action logbook. Examples of routine corrective action situations: surrogate/surrogates out, LCS out, CCV out, ICV out, IS area/areas out, typographical errors, random blank contamination, or false positive hit/spectral ID match corrected during data review.

Non-Routine Corrective Action – A non-routine corrective action is taken when the out-of-control event encountered is not typical for the method. For example, QC failures that passes through the final review to the client, procedural errors – not following the SOP, or a situation not being detected by normal QA procedures that could adversely impact the accuracy, precision, etc. of a result. Non-routine corrective actions must be documented in the Corrective Action Request (CAR) system, located within the LIMS. The analyst, using his/her own judgement, may deem any corrective action situation non-routine and formally document it in a CAR. When in doubt about a corrective action, the analysts are instructed to err on the side of formal CAR documentation. Examples of non-routine corrective action situations include: bad standard, expired standard mix being used, incorrect equation, "client-detected" problems, not following SOP protocols, using bad or contaminated lot of chemical/reagent/solvent, deciding to release data not conforming to SOP requirements, compound retention time outside of range, or improper library spectrum that leads to re-occurring mis-identification of compounds.

The essential steps in Spectrum Analytical, Inc. RI Division's corrective action system are:

1. Identify and define the problem.

2. Assign responsibility for investigating the problem. Usually this individual is the department supervisor.

3. Investigate and determine the root cause of the problem.

4. Determine a corrective action to eliminate the problem and prevent recurrence. Any changes that result from the corrective action investigation must be documented.

5. Assign and accept responsibility for implementing the corrective action.

6. Establish effectiveness of the corrective action and implement it.

7. Verify that the corrective action has eliminated the problem.

8. Both the laboratory and the QA Department need to monitor the corrective action to ensure it is effective.

9. Any corrective actions that cast doubt on the laboratory's compliance with its own policies and procedures may require an internal audit by the QA Department.

This scheme is generally accomplished through the use of Corrective Action Report Forms available to each of the laboratory areas within the LIMS system. Use of this report notifies the QA Department of a potential problem as described in SOP No. 80.0007. The QA Director initiates the corrective action by relating the problem to the appropriate laboratory managers and/or project managers who then investigate or assign responsibility for investigating the problem and determine its cause. Once determined, the QA Director will approve appropriate corrective action. Its implementation is later verified through an internal laboratory audit. Once the QA Director feels the system has returned to control, s/he will finalize the CAR using a password protected QA step.

Information contained on corrective action reports is kept confidential within Spectrum Analytical, Inc. RI Division and is generally limited to the individuals involved. Severe problems and difficulties may warrant special reports to the President of Spectrum Analytical Inc., who will ensure that the appropriate corrective actions are taken.

Nonconformance:

Any breech of standard protocols is a nonconformance item that is documented on the Corrective Action Request Form and management informed immediately. The following are nonconformance items:

1. Sample holding time exceeded.

2. Hoods, Class "1" weights, NIST Thermometers, balances, automatic pipettes, being used but not certified.

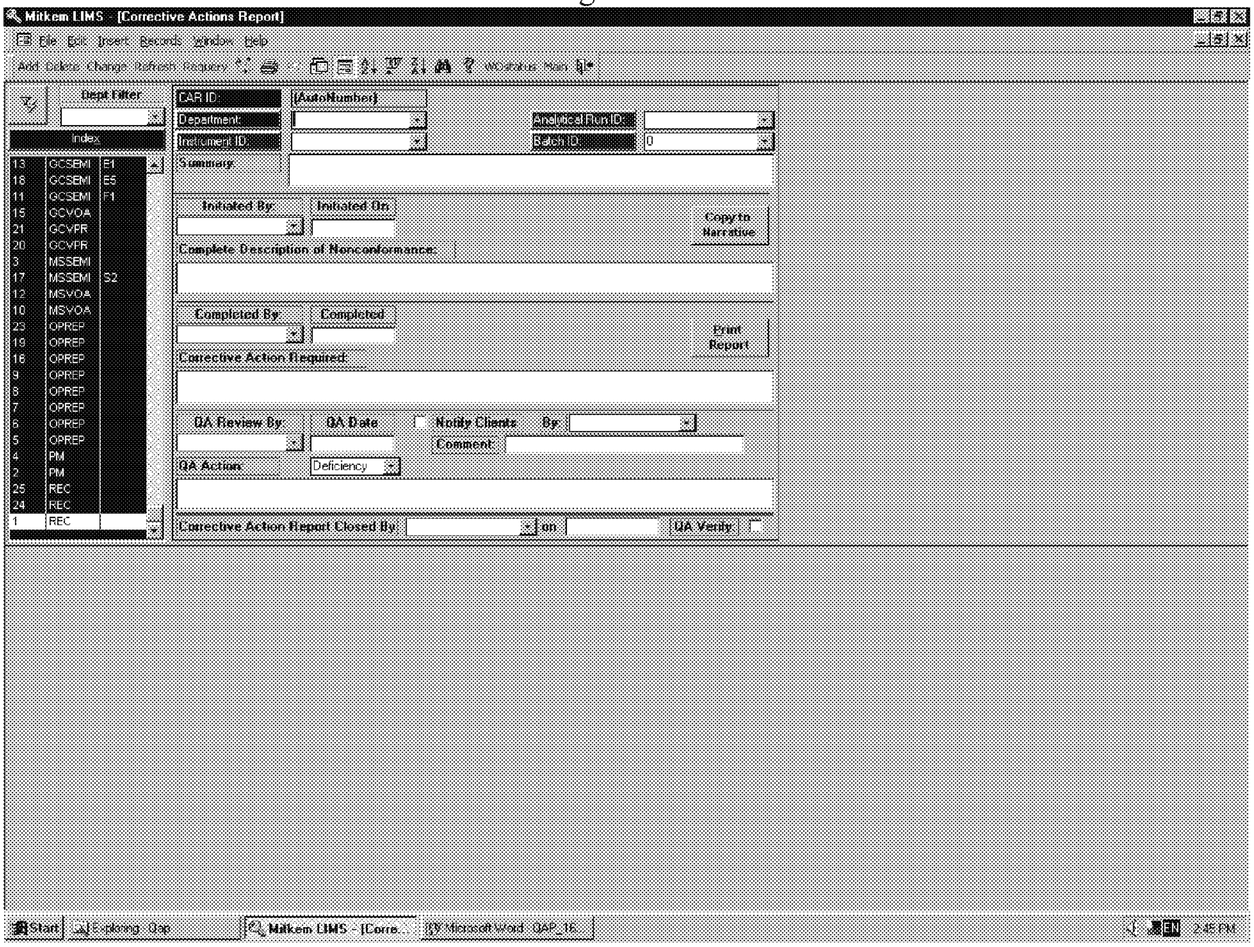
3. Expired standards being used.

4. Manual integration being misrepresented.

16.1 Client Complaints:

Spectrum Analytical, Inc. RI Division ensures client complaints are dealt with quickly and completely. The policies are stated in the laboratory Client Complaint Standard Operating procedure (SOP No. 80.0002).

Figure 16-1



Quality Assurance Corrective Action Request Form

17.0 QUALITY ASSURANCE REPORTS TO MANAGEMENT

The Spectrum Analytical, Inc. RI Division Quality Assurance Director submits a QA report annually to upper management. The report should be completed and submitted no later than the 15th of July in any calendar year.

The report contains detailed laboratory information and QA activities during the previous twelve months. Items to include are the status of internal and external audits, client complaints, quality control activities, resources and staffing. See the following pages for the report format.

Management will review the QA report and respond to outstanding issues. Management will add a review of the suitability of policies and procedures, and any other relevant issues. The response report is due within 30 days of the QA Report receipt.

A copy of the report is kept on file in the QA department.

In case of a severe problem or difficulty, a special report is prepared by the QA Director and submitted immediately to management.

Figure 17-1

SPECTRUM ANALYTICAL, INC. RI DIVISION
Annual Quality Assurance Report to Management

1. Status of Internal Audits.

2. Status of External Audits.

3. Identification of Quality Control issues in the laboratory.

4. Discussion of corrective action issues.

5. Proficiency Testing.

6. Changes in volume and type of work undertaken.

7. Client Feedback.

8. Reports from management and supervisory personnel.

18.0 SAFETY

Spectrum Analytical, Inc. RI Division maintains safety through a program managed by the Safety Officer and the Safety Committee. Responsibilities include many activities needed to comply with the Right-to-Know Laws.

- Training seminars with information on OSHA safety instruction for new employees.
- Introductory training to include location of fire extinguishers, first aid supplies, etc.
- Health and Safety manual review when hired.
- Annual Health and Safety Manual review and revision as needed.
- Monthly Safety Committee meetings.
- Centralized MSDS information.
- Maps with safety equipment and all exits noted.
- Posted safety rules.

If a chemical spill occurs, proper actions are described in Spectrum Analytical, Inc. RI Division's Contingency Plan. Additionally, the local fire department (North Kingstown) and hospital (Kent County) also have a copy in case a need arises. Each new hire is required to read the Contingency Plan and sign off on this. An annual meeting is held as a refresher for all employees. A copy of the Contingency Plan is located on the company Intranet and is available to all personnel.

Emergency equipment, such as spill control kits, fire extinguishers and fire blankets are located throughout the laboratory areas. The Contingency Plan has instructions for evacuation, notification of emergency authorities and regulatory personnel in the event of a chemical accident.

19.0 WASTE MANAGEMENT

19.1 Pollution Prevention

The waste management option of choice is to prevent pollution by minimizing the amount or types of chemical wastes that are generated. Spectrum Analytical, Inc. RI Division's ability to minimize waste generation is limited by the chemical analysis techniques that are required by the EPA or other authors of test methods. As new test methods are utilized in the laboratory, the type and volume of chemical waste generated by the new test is considered. Analysts and Supervisors are encouraged to look for ways to reduce the amount of chemical waste, or the type of chemical waste generated during the testing process; HOWEVER, no method is allowed to be modified without discussion among the Laboratory and/or Technical Director, QA Director and other management personnel to determine the affect of the change on the resulting data.

19.2. Waste Management

Spectrum Analytical, Inc. RI Division has identified and routinely disposes of chemical wastes in several hazardous waste streams. In general these are acids, caustics, solvent wastes and various laboratory waste solids. No laboratory chemical waste is disposed in the trash or dumped down the drain. All remaining sample volume following testing, and after contract-required disposal date has past, are disposed in one of these waste streams. These wastes are fully described in Spectrum Analytical Inc., RI Division's Contingency/Waste Management Plan and in the lab's Profile Log. New England Disposal Technologies is Spectrum Analytical, Inc. RI Division's waste hauler. Other hazardous wastes are identified and properly disposed according to these documents.

Continued compliance is monitored monthly by an outside consultant to ensure all RI DEM regulations are met. Key personnel attend an annual RCRA Facility Training, which focuses on the requirements for hazardous waste disposal and its proper documentation.

20.0 DEFINITIONS, ACRONYMS, ABBREVIATIONS:

ACCURACY: The closeness of agreement between an observed value and an accepted reference value.

ALIQUOT: A measured portion of a field sample, standard, or solution taken for sample preparation and/or analysis.

ANALYTICAL SERVICES BRANCH (ASB): The division of United States Environmental Protection Agency's (USEPA) Office of Superfund Remediation and Technology Innovation (OSRTI) responsible for the overall management of the Contract Laboratory Program (CLP).

ASTM: American Society for Testing and Materials, a developer and provider of voluntary consensus standards.

BATCH: A group of samples of the same matrix that are processed as a unit at the same time in the same location using the same method.. Unless defined differently by a specific analytical method (such as Oil & Grease by Method 1664), the maximum batch size is 20 samples.

BIAS: The deviation due to analytical or matrix effects of the measured value from a known spiked amount.

BLANK: A "clean" matrix analysis. Such as: Equipment Blank, Method Blank, and Trip Blank.

BREAKDOWN: A measure of the decomposition of certain analytes (DDT and Endrin) into by-products.

CAS: Chemical Abstracts Service, a registry where chemicals are assigned identification numbers.

CCB: Continuing Calibration Blank

CCV: Continuing Calibration Verification standard.

CLP: Contract Laboratory Program. A contract used by EPA to purchase analytical services. Also refers to the test protocols described in that contract. The CLP analyses can be used for EPA or for other clients. CLP-format data reports are arranged as described in the EPA CLP contract, including specified data report pages and all raw data.

CONTROL SAMPLE: A QC sample introduced into a process to monitor the performance of the system.

DL: Dilution, not used when the initial analysis is performed at dilution, but is used for a secondary dilution.

DoD: Department of Defense.

DUPLICATE: See Matrix Duplicate, Field Duplicate, and Matrix Spike Duplicate.

EQUIPMENT BLANK: A sample of analyte-free water that has been used during sample collection to measure any contamination introduced during sample collection.

ICB: Initial Calibration Blank

ICV: Initial Calibration Verification standard

IDL: Instrument Detection Limit. Statistical value similar to MDL, but with analyses performed on standards that have not been through the sample preparation process.

FIELD DUPLICATES: Independent samples that are collected as close as possible to the same point in space and time. They are two separate samples taken from the same source, stored in separate containers, and analyzed independently. These duplicates are useful in documenting the precision of the sampling process.

HT Holding Time. The maximum times that samples may be held prior to analysis and still be considered valid or not compromised (40CFR Part 136). DoD also clarifies the HT to mean the time elapsed from the time of sampling to the time of extraction or analysis , or from extraction to analysis…

LAB CONTROL SAMPLE (LCS): A blank spiked with compound(s) representative of the target analytes. This is used to document laboratory performance in a “clean” matrix.

LOD: Limit of Detection. The smallest amount of concentration of a substance that must be present in a sample in order to be detected at a high level of confidence (99%), per DoD.

LOQ: Limit of Quantitation (LOQ). The lowest concentration that produces a quantitative result within specified limits of precision and bias. The LOQ is typically set at or above the concentration of the lowest initial calibration standard.

MATRIX: The component or substrate (e.g., water, soil, air, and oil) which contains the analyte of interest.

MATRIX DUP (DUP): A sample split by the laboratory that is used to document the precision of a method in a given sample matrix.

MATRIX SPIKE (MS): An aliquot of sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

MATRIX SPIKE DUP (MSD): Laboratory split samples spiked with identical concentrations of target analyte(s). The spiking occurs prior to sample preparation and analysis. They are used to document the precision and bias of a method in a given sample matrix.

MCL: Maximum Contaminant Level (MCL) is the highest concentration of a contaminant that is allowed in drinking water.

METHOD BLANK(MB): An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

METHOD DETECTION LIMIT (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte. For operational purposes, when it is necessary to determine the MDL in the matrix, the MDL should be determined by multiplying the appropriate one-sided 99% t-statistic by the standard deviation obtained from a minimum of seven analyses of a matrix spike containing the analyte of interest at a concentration estimated to be three to five times the MDL, where the t-statistic is obtained from standard references.

MSA: Method of Standard Additions

ND: Not Detected. Used in conjunction with the reporting limit.

ORGANIC-FREE REAGENT WATER: For volatiles, all references to water in the methods refer to water in which an interferent is not observed at the reporting limit of the compounds of interest. Organic-free reagent water can be generated by passing tap water through a carbon filter bed containing about 1 pound of activated carbon. A water purification system may be used to generate organic-free deionized water. For semivolatiles and nonvolatiles, all references to water in the methods refer to water in which an interferent is not observed at the reporting limit of the compounds of interest.

PPB: Parts Per Billion, ug/L, ug/Kg

PPM: Parts Per Million, mg/L, mg/Kg

PQL: Practical Quantitation Limit. Equivalent to Reporting Limit.

PRECISION: The agreement among a set of replicate analyses.

PS: Post Spike. Spike added at the analysis level (as opposed to at the beginning of sample preparation) to determine interferences.

REPORTING LIMIT (RL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. The RL is generally 5 to 10 times the MDL. However, it may be nominally chosen other than these guidelines to simplify data reporting. For many analytes the RL concentration is selected as the lowest non-zero standard in the calibration curve. Sample RLs are matrix-dependent, and are adjusted by the amount of sample analyzed, dilution, and percent moisture. Also see LOQ.

RE: Reextraction or Reanalysis

RPD: Relative Percent Difference, used to determine precision.

RRF: Relative Response Factor. Used for quantification with the internal standard procedure.

RT: Retention Time for a chromatographic peak, as calculated from the time of injection.

SAMPLE: A portion of material to be analyzed that is contained in single or multiple containers and identified by a unique sample number.

SAMPLE DELIVERY GROUP (SDG): A unit within a sample Case that is used to identify a group of samples for delivery.

SERIAL DILUTION (SD): A five-fold dilution of a sample. When corrected by the dilution factor, the diluted sample must agree with the original undiluted sample within specified limits. Serial dilution may reflect the influence of interferents.

SAMPLE MANAGEMENT OFFICE (SMO) - A Contractor-operated facility operated under the SMO contract, awarded and administered by USEPA.

SOP: Standard Operating Procedure.

STANDARD ADDITION: The practice of adding a known amount of an analyte to a sample immediately prior to analysis. It is typically used to evaluate interferences.

STANDARD CURVE: A plot of concentrations of known analyte standards versus the instrument response to the analyte. Calibration standards are prepared by successively diluting a standard solution to produce working standards which cover the working range of the instrument. Standards should be prepared at the frequency specified in the appropriate method. The calibration standards should be prepared using the same type of acid or solvent and at the same concentration as will result in the samples following sample preparation. This is applicable to organic and inorganic chemical analyses.

SURROGATE: An organic compound that is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples.

TRIP BLANK: A sample of analyte-free media taken from the laboratory to the sampling site and returned to the laboratory unopened. A trip blank is used to document contamination attributable to shipping and field handling procedures. This type of blank is useful in documenting contamination of volatile organics samples.

From EPA SW-846, Revision 4, 40CFR Part 136, DoD QSM and other sources.

SPECTRUM ANALYTICAL, INC. RI DIVISION

MAJOR INSTRUMENTATION and EQUIPMENT LIST

APPENDIX A

Laboratory Information System Equipment

1. **Data Collection**:

1.1. Seventeen- Hewlett Packard (HP) chem station software for collecting GC and GC/MS data (below) and one Perkin Elmer (PE) Total Chrom for collecting data from the GC-TCD/SCD.

- 5 GC-ECD (GCSEMI)
- 1 GC-FID (GCSEMI)
- 6 GC-MS (MSSEMI)
- 5 GC-MS (MSVOA)
- 1 GC-Hall/PID (GCVOA)
- 1 GC-FID/NPD (GCVOA)

1.2. Hardware varies but is x86 compatible

1.3. OS is Windows, Various Versions (9x, NT, 2000,Xp)

2. **Data Storage**:

2.1. Dell Poweredge servers (Windows 2003 server)

2.1.1. Bernoulli (primary file server, non-organic instrument data)
- Dual core Xeon processor
- 4 GB RAM
- 1 TB storage
- Symantec Backup Exec 12.5
- Tape drive Tandberg Data LTO-5 (1500-3000 GB)

2.1.2. Avogadro (organic instrument data)
- Dual P IV Xeon processors
- 2 GB RAM
- 105 GB storage
- Tape drive Tandberg LTO-2 (200-400 GB)

2.1.3. Planck (database server)
- Dual P IV Xeon processors
- 2 GB RAM
- 450 GB storage
- Tape drive Seagate LTO-1 (100-200 GB) not currently used

2.2. Tapes are for daily backup, long term archiving and data restoration

3. **Compound Identification**:

   3.1. Fourteen - Target 4.14 chromatographic software

   3.2. Hardware is Intel based for Target 4.14

   3.3. OS is Windows Xp

4. **Forms Generation**:

   4.1. In-house forms generation LIMS modules for SW-846, ILM and ISM metals

   4.2. In-house forms generation LIMS modules for SW-846, OLC, OLM/ASP and SOM organics

   4.3. Hardware varies but is x86 compatible

   4.4. OS is Windows, Various Versions (2000 and Xp)

Spectrum RI
Equipment List

Department: Inorganics : Metals& Wet Chemistry

Equipment	Manufacturer	Serial #	Date Received	Date in Service	Condition New/Used	Equipment ID	Location
ICP/OES	Perkin Elmer	077N3102302	Nov-03	Nov-03	New	Optima3	Metals
ICP/AES	Perkin Elmer	069N8060801	Nov-98	Nov-98	New	Optima2	Metals
ICP/MS	ThermoScientific	SN01407C	Oct-08	Dec-09	New	X1	Metals
Mercury Analyzer	Perkin Elmer	1131	Mar-00	Mar-00	Used	FIMS1	Metals
Mercury Analyzer	Perkin Elmer	101S7071002	Feb-11	Feb-11	new	FIMS2	Metals
GPR Centrifuge	Beckman Instruments	7M149	Apr-02	Apr-02	Used	Centrifuge	WC
Conductivity Meter	WTW Inolab Cond Level 1	3370010	Apr-02	May-02	New	COND-1	WC
Total Organic Carbon Analyzer	Tekmar/Dohrmann	US03035002	Apr-03	Apr-03	Used	TOC1	WC
Flow Injection Analyzer	Lachat Instruments	A83000-1020	Apr-96	Apr-96	New	Lachat1	WC
Ion Chromatograph	Dionex	95030498E980802	May-03	May-03	New	IC1	WC
Spectrophotometer	Spectronic Instruments	3SGD332010	Apr-02	Apr-02	New	SPEC2	WC
Spectrophotometer	Milton Roy Company	3310004028	Mar-06	Mar-06	New	SPEC3	WC
Pensky Marten	Koehler 16200	5539	June-95	June-95	New	FLASH1	WC
Turbidity Meter	VWR® Model 800	Tur800 2326	April-12	Feb-13	Used	Turb1	WC

COD Reactor	Hach Company	990900019429	Nov-03	Nov-03	New	COD1	WC
COD Reactor	Hach Company	950200012193	Apr-02	Apr-02	New	COD2	WC
Deionized Water Generator	Barnstead E-Pure D4641	1090001208384	Jun-95	Jun-95	New	DI2	WC
pH meter	Oakton Instruments	875001	Jun-12	Jun-12	new	WC-03	WC

Spectrum RI
Balance List

Equipment	Manufacturer	Serial #	Date Received	Date in Service	Condition New/Used	Equipment ID
TOP-LOADING Balance	OHAUS	1121230069	2000	2000	New	TL10
Analytical Balance	Denver A-250	0070742	2010	2010	Used	AB-3
TOP-LOADING Balance	OHAUS Voyager	F2921120391055	2001	2001	New	TL9
TOP-LOADING Balance	Denver	0079896	2000	2000	New	TL1
TOP-LOADING Balance	OHAUS Precision Std.	C22427176	2002	2007	New	TL6
TOP-LOADING Balance	OHAUS Navigator	1121122373	2002	2002	New	TL11
TOP-LOADING Balance	OHAUS	CD8910	2000	2000	New	TL4
TOP-LOADING Balance	OHAUS Navigator	1122173423	2003	2003	New	TL12
TOP-LOADING Balance	OHAUS Scout Pro	7126212230	2007	2007	New	TL13

Spectrum RI
Equipment List

Department: Organic Prep

Equipment	Manufacturer	Serial #	Date Received	Date in Service	Condition new/used	Equipment ID
TurboVap II	Caliper	TV0845N14899	Jan-09	Jan-09	New	TV-4
TurboVap II	Caliper	TV0902N15012	Jan-09	Jan-09	New	TV-3
TurboVap II	Caliper	4364	Mar-08	Mar-08	Used	TV-2
TurboVap II	Caliper	Unable to view	Mar-08	Mar-08	Used	TV-1
Shaker	Glas-Col	412383	Mar-08	Mar-08	New	N/A
Water Bath	Precision Scientific	9508-005	Dec-95	Jan-96	Used	N/A
Nitrogen Concentrator Bath	Organomations	16526	Jun-97	Jun-97	New	NZ1
Deionized Water Generator	Barnstead E-Pure D4641	582941018789	Jun-95	Jun-95	New	DI1
Pressurized Fluid Extractor	Dionex	98070129	Jun-00	Jun-00	New	PFE1
Gel Permeation Chromatograph	J2/AccuPrep	P26D031	Jun-05	Jul-05	New	GPC3
Gel Permeation Chromatograph	J2/AccuPrep	06D-1196-4.1	Jul-07	Aug-06	New	GPC4
Misonex Ultrasonic Disruptor	Sonic Dismembrator Fisher Model 550	Unable to view			New	OPH1
Misonex Ultrasonic Disruptor	Sonic Dismembrator Fisher Model 550	Unable to view			New	OPH2
Misonex Ultrasonic Disruptor	Sonic Dismembrator Fisher Model 500	Unable to view			New	OPH3

Misonex Ultrasonic Disruptor	Sonic Dismembrator Fisher Model 500	Unable to view			New	OPH4
Ultrasonic Cleaner FS30H	Fisher Scientific	RTB030721702	Apr-07	Apr-07	New	N/A
Centrifuge Centra CL-2	International Equipment Company	42606943			Used	N/A

Spectrum RI
Equipment List **Department: GC-Semivolatiles**

Equipment	Manufacturer	Serial #	Date Received	Date in Service	Condition New/Used	Equipment ID	Location
GC/ECD	Hewelett Packard	3336A59890	Oct-94	Oct-94	New	E2	GC-SVOA
GC/ECD	Hewelett Packard	US00032017				E4	GC-SVOA
GC/ECD	Hewelett Packard	US00037060				E5	GC-SVOA
GC/ECD	Hewelett Packard	US00029100	13-Feb	13-Feb	used	E6	GC-SVOA
GC/FID	Hewelett Packard	US00001898				F1	MS-SVOA

Spectrum RI
Equipment List **Department: Receiving**

Equipment	Manufacturer	Serial #	Date Received	Date in Service	Condition New/Used	Equipment ID	Location
Dry Weight Oven	Thello	600011006			used	DWO	REC
Walk in Cooler		Not Applicable			new	R1	REC
Gyrotary Shaker table	New Brunswick Sci. Co.	unable to read			used	n/a	REC
pH meter	Oakton Instruments	1446253	Dec-08	Dec-08	new	WC-02	REC
Kiln model TNF24-3	Paragon Touch n Fire	324341				n/a	WC
Stoppering tray dryer	FTS Systems Dura-Stop M	TD-12-90-133				n/a	WC
Freeze Dryer	FTS Systems Dura-Dry MP	unable to see				n/a	WC
Dessicator	Sanplatec Corp	none	June-06	June-06	New	DryKeeper	REC

Spectrum RI
Equipment List **Department: SVOA**

Equipment	Manufacturer	Serial #	Date Received	Date in Service	Condition New/Used	Equipment ID	Location
GC/MS	Hewelett Packard	US00011367 / US72821130	Nov-99	Nov-99	Used	S3	MS-SVOA
GC/MS	Hewelett Packard	CN10315002/ VS30945365	May-03	May-03	New	S4	MS-SVOA
GC/MS/FID	Hewelett Packard	CN107223014 / US73317299	Jan-08	Jan-08	New	S5	MS-SVOA
GC/MS	Hewelett Packard	CN10261100	Nov-10	Nov-10	Used	S6	MS-SVOA

Spectrum RI
Equipment List **Department: VOA**

Equipment	Manufacturer	Serial #	Date Received	Date in Service	Condition New/Used	Equipment ID	Location
GC/MS	Hewelett Packard	3336A55963				V1	VOA
Auto sampler	OI	13193				V1	VOA
Concentrator	OI	J651460769				V1	VOA
GC/MS	Hewelett Packard	3336A58222				V2	VOA
Auto sampler	OI	13091				V2	VOA
Concentrator	OI	H340460074				V2	VOA
GC/FID/PID	Hewelett Packard	2843A21041				V4	VOA
Auto sampler	Tekmar/Dohrmann	90312004				V4	VOA
Concentrator	Tekmar/Dohrmann	88341012				V4	VOA

Spectrum RI
Equipment List **Department : VOA**

Equipment	Manufacturer	Serial #	Date Received	Date in Service	Condition New/Used	Equipment ID	Location
GC/MS	Hewelett Packard	US00007055				V5	VOA
Auto sampler	OI	13462				V5	VOA
Concentrator	OI	J651460769				V5	VOA
GC/MS	Hewelett Packard	US00031343				V6	VOA
Auto sampler	OI	B03745A407				V6	VOA
Concentrator	OI	J651460769				V6	VOA
GC	Hewelett Packard	3140A37463				V7	VOA
Auto sampler	Tekmar/Dohrmann	US01170015				V7	VOA
GC/MS	Hewelett Packard	CN10411124	Oct-10	Nov-10	NEW	V10	VOA
Auto sampler	Tekmar/Dohrmann	US01157003	Oct-10	Nov-10	USED	V10	VOA
Concentrator	Tekmar/Dohrmann	US02021003	Oct-10	Nov-10	NEW	V10	VOA

Weight Sets

Laboratory weights for daily calibration use:

1. WT1-Organic Prep Weight Set
2. WT2-Organic Prep 100g
3. WT3-Organic Prep 300g
4. WT4-Organic Prep 1kg
5. WT5-Inorganics Weight Set
6. WT6-VOA Weight Set
7. WT7-Unit 3 Weight Set

NIST Class 1 Weight sets:

1. W-01 Denver Instrument set: Serial number 98-121303 Class 1
2. W-03 Troemner set: Serial number 7283 Class 1

Spectrum Analytical, Inc. Rhode Island Division

CONFIDENTIALITY, ETHICS, and DATA INTEGRITY AGREEMENT

APPENDIX B

CONFIDENTIALITY, ETHICS, AND DATA INTEGRITY

The confidentiality, ethics, and data integrity agreement attached must be signed and dated by all new personnel associated with the data generated by Spectrum Analytical, Inc. Rhode Island Division. All said personnel will complete a training course and understand the information stated in the agreement. The course must include the ethical and legal responsibilities including the potential punishments and penalties for improper, unethical, or illegal actions. In addition, personnel are instructed on the importance of data confidentiality in both hard copy and digital forms. All personnel must fully understand this information before signing the agreement. A separate form is used for subcontractors and external auditors that request data for review.

Data Integrity training will be done on an annual basis. All employees are required to attend a training session or read a refresher document and sign off in hardcopy or through the digital SOP Database. All hard copy documents are stored in the employee's personnel file located in the QA Department.

All upper management personnel are required to sign a Non-disclosure Agreement which covers protecting confidentiality and proprietary rights. This Agreement is kept on file at the Spectrum Analytical, Inc., main offices in Agawam, Massachusetts.

SPECTRUM ANALYTICAL, INC.
FEATURING HANIBAL TECHNOLOGY
Rhode Island Division

CONFIDENTIALITY, ETHICS AND DATA INTEGRITY AGREEMENT

I. I, ______________________________ *(Name)*, state that I understand the standards of confidentiality, ethics and data integrity required of me with regard to the duties I perform and the data I report in connection with my employment at Spectrum Analytical, Inc. Rhode Island Division.

II. I agree that in the performance of my duties at Spectrum Analytical, Inc. Rhode Island Division.
:

A. I shall not improperly use manual integrations to meet calibration or method QC criteria, such as peak shaving or peak enhancement.

B. I shall not intentionally misrepresent the date or time of analysis by resetting computer or instrument date/time.

C. I shall not falsify analytical results.

D. I shall not report analytical results without proper analysis documentation to support the results; dry-labbing.

E. I shall not selectively exclude data to meet QC criteria, such as calibration points, without technical or statistical justification.

F. I shall not misrepresent laboratory performance by presenting calibration data or QC limits within data reports that are not linked to the data set reported.

G. I shall not represent matrix interference as basis for exceeding acceptance criteria in interference-free matrices, such as method blanks and Laboratory Control Standards (LCS).

H. I shall not manipulate computer software for improper background subtraction or chromatographic baseline manipulations.

I. I shall not alter analytical conditions such as EM voltage, GC temperature program, etc. from standards analysis to sample analysis.

J. I shall not misrepresent QC samples such as adding surrogates after sample extraction, omitting sample preparation steps, or over-spiking/under-spiking.

K. I shall not report analytical results from the analysis of one sample for those of another.

L. I shall not intentionally represent another individual's work as my own.

III. I agree to report immediately any accidental or intentional reporting of non-authentic data by myself. Such report must be made to any member of Spectrum Analytical, Inc. Rhode Island Division Management or the QA Director (Hanibal Tayeh, Yihai Ding, Edward Lawler, Cinde Gomes, Sharyn Lawler) both orally and in writing.

IV. I agree to report immediately any accidental or intentional reporting of non-authentic data by other employees. Such report must be made to any member of Spectrum Analytical, Inc. Rhode Island Division Management or the QA Director (Hanibal Tayeh, Yihai Ding, Edward Lawler, Cinde Gomes, Sharyn Lawler) both orally and in writing.

V. Questions pertaining to confidentiality, ethics, and integrity may be posed to any of the above individuals.

VI. I agree not to divulge any pertinent confidential information including but not limited to data and any other information about a project to outside sources without the prior consent from the client.

I understand that failure to comply with the above confidentiality, ethics and data integrity agreement can result in my immediate dismissal from Spectrum Analytical, Inc. Rhode Island Division.

.

______________________________ ____________________

(Signature) *(Date)*

____

(Print Name)

Training Session Record

Please read, sign and follow the instruction (s) below.

Subject: Confidentiality, Ethics and Integrity Training to include proper laboratory practices with an understanding of examples and consequences for falsifying data or sharing confidential information. Falsifying data can lead to written warning, termination, business closure, and/or civil or criminal prosecution. It is my responsibility to report to my supervisor (anonymously if I prefer) any acts that could lead to the falsifying of data.

I agree that I understand the procedure referenced above and have attended a training session for its proper implementation.

Staff Member Name	Date	Signature	Staff Member Name	Date	Signature

SUBCONTRACTORS

CONFIDENTIALITY, ETHICS AND DATA INTEGRITY AGREEMENT

I. I, ______________________________ *(Name)*, authorized representative of

______________________________(Subcontractor) state that I understand the standards of integrity required of me and the Subcontractor with regard to the duties performed and the data reported in connection with the analysis/analyses contracted by Spectrum Analytical, Inc. Rhode Island Division.

II. Subcontractor agrees that in the performance of analysis for Spectrum Analytical, Inc. Rhode Island Division:

A. Subcontractor shall not intentionally report data values or results that are not the actual values measured or observed;

C. Subcontractor shall not modify data values unless the modification can be technically justified through a measurable analytical process;

D. Subcontractor shall not intentionally report the dates and times of data analyses that are not the true and actual dates and times of analyses; and

D. Subcontractor shall not intentionally represent another's work as its own.

III. Subcontractor agrees to report immediately any accidental or intentional reporting of non-authentic data to Spectrum Analytical, Inc. Rhode Island Division.

IV. Subcontractor agrees not to divulge any pertinent information including but not limited to data and information about any Spectrum Analytical, Inc. Rhode Island Division projects to outside sources without the prior consent from Spectrum or its clients.

I understand that failure to comply with the above ethics and data integrity agreement can result in immediate termination of the subcontract relationship with Spectrum Analytical, Inc. Rhode Island Division.

______________________________ ______________________________
(Signature) *(Date)*

____
(Name)

____
(Title)

Confidentiality Agreement for External Audits

During the course of the laboratory audit/assessment certain information may become available to the auditor/assessor that is confidential.

All sample-related and project-related information at Spectrum Analytical, Inc. Rhode Island Division is confidential between Spectrum Analytical, Inc. Rhode Island Division and its client.

Any information obtained during the course of this audit/assessment may be used for audit/assessment purposes only.

No information obtained during the course of this audit/assessment may be disclosed by the auditor/assessor to any outside party, regardless of affiliation with the auditor/assessor.

Auditor/Assessor (signature): ______________________________

(Print name): ______________________________

(Date): ______________________________

Company/organization name: ______________________________

QAF.0014

Spectrum Analytical, Inc. RI Division
Resumes of Key Personnel

APPENDIX C

YIHAI DING
Laboratory Director

Mr. Ding has experience in a wide variety of analytical chemistry techniques, including GC, GC/MS, HPLC and FTIR. His expertise includes the operation, calibration and maintenance of sophisticated analytical instrumentation, and the efficient operation of state of the art environmental service laboratories.

Mr. Ding's responsibilities as Laboratory Director at Spectrum Analytical, Inc. Featuring Hanibal Technology Rhode Island Division, involves the daily coordination of all laboratory sections to insure the production of high quality data meeting customer's technical and schedule requirements. His duties in this role include overseeing department supervisors and analysts in the daily calibration, maintenance and troubleshooting of analytical instruments, monitoring schedules and holding times, analysis of samples, review of sample and QC data. He also is involved with the implementation of Standard Operating Procedures, documentation of instrument and method QC criteria and development of new methods and implementation of new analytical technology.

Mr. Ding's prior experience includes research into the mechanisms and kinetics of various biochemical processes. A large portion of this research has required the analysis of reactants and products using state-of-the-art chemical instrumentation. Mr. Ding has also taught chemistry and biochemistry laboratory courses at the university level.

EDUCATION

MIDDLE TENNESSEE STATE UNIVERSITY
Murfreesbro, Tennessee
- Chemistry, MS

JILIN UNIVERSITY
Changchun, China
- Biochemistry, BS

RELATED EXPERIENCE

2005-present

Spectrum Analytical, Inc., Featuring Hanibal Technology, Rhode Island Division (formerly Mitkem)
- Laboratory Director

2005	**STL LABORATORIES** Savannah, Georgia - Supervisor of Semi-Volatile GC and GC/MS - GC/MS Analyst - GC/ECD Analyst
1998-2005	**MITKEM CORPORATION** Warwick, Rhode Island - GCMS Supervisor for both Volatile Organics and Semi-Volatile Organics Laboratories - GC/MS Analyst
1994-1998	**MIDDLE TENNESSEE STATE UNIVERSITY** Murfreesboro, Tennessee - Researcher - Laboratory Instructor, chemistry and biochemistry
1993-1994	**NATIONAL ENZYME ENGINEERING LAB** Changchun, China - Researcher

SHARYN B. LAWLER

Quality Assurance Director

Ms. Lawler has over twenty years of experience in the environmental laboratory industry. She has experience in implementation, operation and management of QA systems operating under USEPA, US Army Corps of Engineers and NELAC programs.

Ms. Lawler's responsibilities as Quality Assurance Director include development and implementation of the Quality Assurance Plan and Standard Operating Procedures. Her duties include interacting with federal and state regulatory officials in the acquisition and maintenance of laboratory certifications. She is also responsible for managing Spectrum Analytical, Inc. Rhode Island Division's document control program. Ms. Lawler performs both internal and external audits as well as overseeing the corrective action system, training program and evaluating QC check samples.

Previously Ms. Lawler was a senior data reviewer, where she was responsible for final QA/QC review of organic, metals and wet chemistry data. She insured final data met all method and in-house QC criteria prior to release to the customer, and that any issues were documented and described for inclusion in case narratives. A significant portion of this work involved review of full CLP-format data deliverables packages, both for standard as well as non-routine analyses. Prior to Spectrum Analytical Inc., Ms. Lawler worked for two CLP laboratories where she held positions including senior data review specialist, CLP Organics Task Manager and analyst in several laboratory sections.

EDUCATION:

UNIVERSITY OF MASSACHUSETTS
Amherst, Massachusetts
Independent Conc., Coastal Plant Ecology, BS

RELATED EXPERIENCE:

1997-Present

Spectrum Analytical Inc., Featuring Hanibal Technology, RI Division (formerly Mitkem)
- QA Director
- Senior Data Reviewer

1988-1997	**NATIONAL ENVIRONMENTAL TESTING** Bedford, Massachusetts - Senior Data Reviewer - CLP Organic Task Manager
1983-1988	**CAMBRIDGE ANALYTICAL ASSOCIATES** Boston, Massachusetts - CLP Organic Task Manager - Semivolatiles Analyst - Preparation Laboratory Analyst

EDWARD A. LAWLER

Business Development Coordinator /Sr. Project Manager

Mr. Lawler has over thirty years of experience in environmental laboratory operations. He has extensive experience in managing laboratory workflow and in establishing and maintaining customer relationships. He also has considerable experience in a wide range of environmental chemical analyses, with a concentration in trace level volatile organics analysis.

As Business Development Coordinator, Mr. Lawler is responsible for securing contracts and BOA agreements with clients as well as pursuing new contracts and bids. He also works closely with lab staff to ensure they are aware of specific data deliverable requirements for new projects.

As Senior Project Manager, Mr. Lawler manages certain significant analytical testing programs, acting as principal technical liaison with the client. His extensive experience in laboratory data review allows him to ensure QA/QC criteria have been achieved, as well as preparing project narratives detailing these findings to the client.

Mr. Lawler's past responsibilities as Deputy Director for Quality Services included the prioritization of all analytical chemistry testing at Spectrum Analytical, Inc. Rhode Island Division. This included daily meetings with laboratory supervisors and managers to insure all technical and schedule requirements were met.

Mr. Lawler's previous experience includes various staff, management and senior management positions at several environmental testing laboratories. Direct project experience includes EPA CLP, Army MRD, Navy NEESA and NFESC, DOD HAZWRAP and New York DEC ASP programs. Mr. Lawler has also provided expert testimony at several Superfund trials including pre-trial consulting and trial witness services.

EDUCATION: **UNIVERSITY OF MASSACHUSETTS**
Amherst, Massachusetts
Environmental Sciences, BS 1977

RELATED EXPERIENCE:

1997- Present	**Spectrum Analytical Inc., Featuring Hanibal Technology, Rhode Island Division (formerly Mitkem)** - Business Development Coordinator - Senior Project Manager - Deputy Director for Quality Services - Operations Manager
1989-1997	**NATIONAL ENVIRONMENTAL TESTING, CAMBRIDGE DIVISION** Bedford, Massachusetts - Division Manager - Proposal/Contract Manager - Director of Project Management
1983-1989	**CAMBRIDGE ANALYTICAL ASSOCIATES, INC.** Boston, Massachusetts - Project Manager - Volatile Organic Laboratory Manager
1978-1983	**ENERGY RESOURCES COMPANY, INC. - ERCO** Cambridge, Massachusetts - Volatile Organics (GC) Manager - Analytical Chemist-Volatile Organics Lab - Analytical Chemist-Organic Preparation Lab
1978	**LAPUCK LABORATORIES, INC.** Watertown, Massachusetts - Analytical Chemist-Wet Chemistry & Metals - Microbiologist

SCOTT P. HUNTLEY

IT Manager

Mr. Huntley has over twenty years experience in the environmental testing field. He has considerable experience in computer sciences and had been involved, throughout his career, in the setup and implementation of several Laboratory Information Management Systems (LIMS) and automated data reduction systems. Mr. Huntley's responsibilities include the set-up and validation of automated data transfer, reduction, storage, evaluation and reporting programs within Spectrum Analytical, Inc. RI Division's LIMS. He also is responsible for set-up of the electronic data delivery capabilities as well as the control charting capabilities of this system.

Previously Mr. Huntley has held several supervisory positions in environmental laboratories focusing on CLP and other DOD analytical programs. He has a wide range of experience in routine and state of the art analytical programs and methods. Mr. Huntley is experienced in the use of automated data transfer and reduction systems and laboratory automation techniques.

EDUCATION:

RHODE ISLAND COLLEGE
Providence, Rhode Island
Chemistry, BS
Computer Science, BS

RELATED EXPERIENCE:

1999-Present

Spectrum Analytical, Inc., Featuring Hanibal Technology, RI Division (formerly Mitkem)
MIS Senior Systems Analyst

1996-1999

MITKEM CORPORATION
Warwick, RI
- Senior Chemist
- Organic Lab Manager

1991-1996

EA LABORATORIES
Sparks, MD

- Supervisor of Organic Chemists

1989-1991	**CEIMIC CORPORATION** Narragansett, RI - Night shift supervisor
1986-1989	**RI ANALYTICAL LABORATORIES** Providence, RI - GC Chemist

Catherine L. Mosher

Organics (SVOA/VOA) Department Manager

Ms. Mosher has experience in a wide variety of analytical chemistry techniques, including GC/FID and GC/MS. Her expertise includes the operation, calibration and maintenance of sophisticated, computer controlled instrumentation. Her expertise also includes analyses and QA review of forensics extended alkylated PAH and Biomarker analyses.

Ms. Mosher is employed as the Organics Department Manager in Spectrum Analytical Inc. Rhode Island Division, and oversees both the Volatile and Semivolatile departments. Ms. Mosher's responsibilities involve the coordination of organics analyses using GC/MS and GC instrumentation following both US EPA CLP and SW846 protocols. Her duties in this role include supervising analysts in the daily calibration, maintenance and troubleshooting of analytical instruments, monitoring schedules and holding times, analysis of samples, review of sample and QC data. She is involved with the implementation of Standard Operating Procedures, documentation of instrument and method QC criteria and development of new methods and implementation of new analytical technology. Ms. Mosher also insures the production of organic data is coordinated with other laboratory sections.

EDUCATION

Community College of Rhode Island
Warwick, Rhode Island
Certificate of Chemical Technology - 1991

RELATED EXPERIENCE

02/2007-Present

Spectrum Analytical Inc., Featuring Hanibal Technology, Rhode Island Division (formerly Mitkem)
- Manager, SVOA Department
- Senior Scientist, SVOA Laboratory

05/2005 – 12/2006

Alpha Woods Hole Laboratories
Raynham, MA
- Development of Volatile Air Laboratory

- Supervisor for Organics analyses including GC/MS VOA and SVOA, ECD's and FIDs
- Forensic Team Leader

03/1997 – 05/2005	**Woods Hole Group Laboratories** Raynham, MA - Forensic Team Leader - GC/MS Group Leader
04/1996 – 03/1997	**Inchcape Testing** New Bedford and Raynham, MA - Semivolatile analyst - Volatile analyst
09/1991 – 04/1996	**Energy and Environmental Engineering Inc.** Somerville, MA - Semivolatile GC/MS Supervisor - GC-Pesticide/PCB analyst
01/1989 – 09/1991	**New England Testing Laboratory** North Providence, RI - Senior Chemical Technician - including Organic, Inorganic, Metals, and Microbiology analyses
10/1987 – 09/1988	**Rhode Island Analytical Laboratory** Warwick, RI - Chemical Technician

HUIYAN HEATHER ZHAO-ANDERSON
Inorganics Department Manager

Ms. Zhao-Anderson is employed as the Manager in Spectrum Analytical Inc. Rhode Island Division's Inorganics Department. Ms. Zhao-Anderson's responsibilities involve the coordination of metals and wet chemistry analyses using ICP/MS, ICP/AES and a variety of other instrumentation following both US EPA CLP and SW846 protocols. Her duties in this role include supervising analysts in the daily calibration, maintenance and troubleshooting of analytical instruments, monitoring schedules and holding times, analysis of samples, review of sample and QC data. She is involved with the implementation of Standard Operating Procedures, documentation of instrument and method QC criteria and development of new methods and implementation of new analytical technology. Ms. Zhao-Anderson also insures the production of inorganics organic data is coordinated with other laboratory sections. Prior to managing the inorganic department, Ms Zhao-Anderson was the department manager of our volatile organics laboratory for several years.

EDUCATION

Yale University
New Haven, CT
School of Forestry and
Environmental Study, MS 2005

Peking University
Beijing, China
Environmental Science and Economics
BS 2002

RELATED EXPERIENCE

09/2005 -Present

Spectrum Analytical Inc., Featuring Hanibal Technology, Rhode Island Division (formerly Mitkem)
- Manager, Inorganic Department
- Manager, VOA Department
- GC/MS Chemist, VOA Laboratory

DAWNE SMART

Data Reviewer, Project Manager, Data Reporting Supervisor

Ms. Smart's responsibilities as project manager involve the management of Spectrum Analytical Inc. Rhode Island Division's EPA Contract Laboratory Program (CLP) analytical services contract for ISM. This includes the daily oversight of incoming samples, maintenance of chain of custody documentation and communication records and resolution of any discrepancies or other issues involving CLP ISM sample assignments. Her responsibilities also include ongoing communication with EPA, sampler and CSC personnel, as well as monitoring data delivery schedules, writing project narratives and finalizing case communication.

Ms. Smart also is currently supervising the Data Reporting staff. She oversees the staff that generates data packages for all inorganic and organic fractions for different levels of report packages that will then go to data review personnel. Additionally, she and her staff are responsible for final report generation when all fractions of a project are completed, including bookmarking, pagination, final package posting to the website and hard copy report mailing if applicable.

Ms Smart also reviews sample and QC data, and completed CLP data packages for both organic and inorganic programs. Ms. Smart has extensive experience in Data Review as well as Quality Assurance. A significant portion of her previous employment included management of the Data Review department as well as the on-site QA Specialist for a major specialized laboratory.

EDUCATION

COMMUNITY COLLEGE of RHODE ISLAND
Warwick, Rhode Island
Certificate of Chemical Technology - 1991
Associate in Applied Science - 1997

RELATED EXPERIENCE

2007-Present

Spectrum Analytical Inc., Featuring Hanibal Technology, Rhode Island Division (formerly Mitkem)
- Data Reporting Supervisor
- ISM Contract manager

	-Manager, Metals Department -Supervisor, Inorganic Department
1999 – 2007	**ALPHA WOODS HOLE LABORATORIES** Raynham, Massachusetts -QA Specialist -Manager, Data Review Department
1996 – 1999	**ANALYTICAL BALANCE COMPANY** Middleboro, Massachusetts - Department Head, Metals Analysis
1995 – 1996	**FOXBORO COMPANY** West Bridgewater, Massachusetts - Chemist
1988 – 1995	**NEW ENGLAND TESTING LABORATORY** North Providence, RI - Senior Laboratory Technician - Laboratory Technician
1987 – 1988	**RHODE ISLAND ANALYTICAL LABORATORIES** Warwick, RI - Metals Preparation Technician - Laboratory Assistant -

AGNES R. HUNTLEY

Project Manager

Ms. Huntley has gained extensive and diversified experience in environmental laboratories using U.S. EPA CLP and SW846 methodologies, as well as participating in US Navy and Army analytical services programs.

Ms. Huntley's responsibilities involve the management of Spectrum Analytical Inc. Rhode Island Division's EPA Contract Laboratory Program (CLP) analytical services contracts. This includes the daily oversight of incoming samples, maintenance of chain of custody documentation and communication records and resolution of any discrepancies or other issues involving CLP sample assignments. Her responsibilities also include ongoing communication with EPA, sampler and CSC personnel, as well as monitoring data delivery schedules, writing project narratives and finalizing case communication. Ms. Huntley has managed four contracts with the EPA, which included one Organics Low Concentration (OLC), two Organics Low/Medium Concentration (OLM) and one Inorganics Low/Medium Concentration (ILM) analytical services contracts. At present Ms. Huntley manages the Organics Multi-Media, Multi-Concentration (SOM01.2) Analytical Services Contract.

Previously, Ms. Huntley held the position of QA/QC Manager where her responsibilities included the development and implementation of Standard Operating Procedures, documentation of instrument and method performance using Method Detection Limit studies, and routine review of final laboratory data reports, review of analyst training and performance data and management of the corrective action system. Her duties also included interaction with federal and state regulatory officials in the acquisition and maintenance of laboratory certifications.

Prior experience includes management of the daily operations of the Organic Preparation Laboratory. Duties in this position included monitoring sample backlog, holding times, process work flow, and delivery due dates. Ms. Huntley also developed and implemented new test methods, trained laboratory staff, performed instrument maintenance and reviewed sample and QC data. Prior to joining Spectrum Analytical Inc. Ms. Huntley worked as an analytical chemist at NET Cambridge Division performing analyses under a wide variety of programs including Army COE, Navy NEESA, DOE HAZWRAP and EPA CLP.

EDUCATION

SIMMONS COLLEGE
Boston, Massachusetts
- Chemistry, BS
- Mathematics, BS

RELATED EXPERIENCE

1997-Present	**Spectrum Analytical, Inc., Featuring Hanibal Technology, Rhode Island Division (formerly Mitkem)** - Project Manager, SOM Contract manager - Supervisor, Sample Receiving Department
1997-2008	**MITKEM CORPORATION** Warwick, Rhode Island - CLP Project Manager - QA/QC Manager - Manager, Sample Preparation Laboratory
1995-1997	**NATIONAL ENVIRONMENTAL TESTING** Bedford, Massachusetts - Chemist, Organic Preparation
1992-1995	**SIMMONS COLLEGE CHEMISTRY DEPT.** Boston, Massachusetts - Teaching Assistant, Chemistry Department

QAP Revision Page:

Rev 1 (02/01/2013): Included Facility floor plan, Updated Org Chart, updated equipment list, DW metals reporting requirements per 310 CMR 42

Appendix B: Field Sample Collection Forms

Tetra Tech, Inc.

BULK SAMPLE LOG SHEET

Page ___ of ___

Project Site Name: South Helix House (S-0) PCB investigation
Project No.: 112IG05184

Sample Location: South Helix House
Sampled By: M.Horton / M. Flory
C.O.C. No.:

Samples Collected:
SHHTR-CO-01
SHHTR-CO-02
SHHTR-CO-03
SHHTR-CO-04
SHHTR-CO-05
SHHTR-CO-06

Type of Sample:
[ ] Low Concentration
[ ] High Concentration

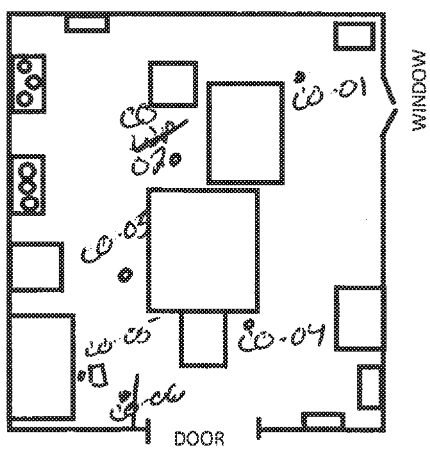
SAMPLE DATA:

ID	Date	Time	NOTES	Analysis: RCRA 8 Metals	SVOCs	PCBs
SHHTR-CO-01	8-5-13	1430	-collected approximately 1' off corner of transformer pad - 8 holes	NO	NO	YES
SHHTR-CO-02	8-5-13	1440	-collected from center of area between 3 pieces of equipment 6 holes	NO	NO	YES
SHHTR-CO-03	8-5-13	1448	-collected next to large center unit DUP 01 12 holes	NO	NO	YES
SHHTR-CO-04	8-5-13	1500	-collected at corner across from door 6 holes	NO	NO	YES
SHHTR-CO-05	8-5-13	1507	-collected between the hole and De-Ice equipment	NO	NO	YES
SHHTR-CO-06	8-~~5~~-13	1514	collected along side of trench away from door	NO	NO	YES

OBSERVATIONS / NOTES:

-all samples are concrete (Floor)

MAP:



QC Sample Designation:

MS/MSD	Duplicate ID No.: SHHTR-CO-DUP01
—	Associated Sample ID: SHHTR-CO-03

Signature(s): [signature]

Tetra Tech, Inc.

BULK SAMPLE LOG SHEET

Page___ of ___

Project Site Name: South Helix House (S-0) PCB Investigation
Project No.: 112IG05184

Samples Collected:
SHHTR-CO-07
SHHTR-CO-08
SHHTR-CO-09
SHHTR-CO-10
SHHTR-CO-11
SHHTR-CO-12

Sample Location: South Helix House Transfer Room
Sampled By: M.Horton / M. Flory
C.O.C. No.:

Type of Sample:
[ ] Low Concentration
[ ] High Concentration

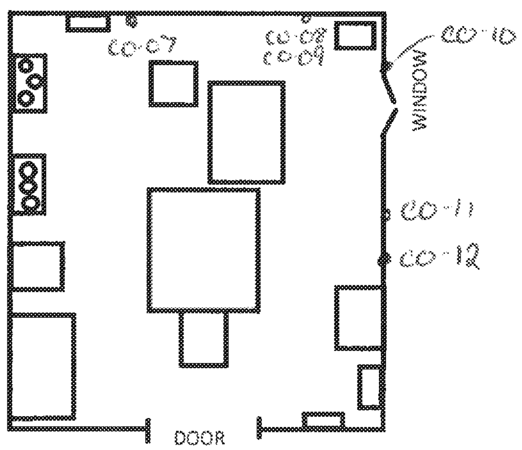
SAMPLE DATA:

ID	Date	Time	NOTES	Analysis: RCRA 8 Metals	SVOCs	PCBs
SHHTR-CO-07	8-5-13	1525	collected on back wall, left side, 1' above the floor	YES / NO	YES / NO	YES / NO
SHHTR-CO-08	8-5-13	1533	collected on back wall, right side, 1' above the floor	YES / NO	YES / NO	YES / NO
SHHTR-CO-09	8-5-13	1539	collected on back wall, right side 4' above the floor	YES / NO	YES / NO	YES / NO
SHHTR-CO-10	8-5-13	1547	collected on right wall, on the back end, 1' above floor Lab QC	YES / NO	YES / NO	YES / NO
SHHTR-CO-11	8-5-13	1554	collected center of the right wall, 4' above floor	YES / NO	YES / NO	YES / NO
SHHTR-CO-12	8-5-13	1600	collected on right wall, center (towards door end) 1' above floor	YES / NO	YES / NO	YES / NO

OBSERVATIONS / NOTES:

- all samples are concrete
- CO-09 not collected at center of wall because there was not enough space between transformer equipment and wall to use hammer drill

MAP:



QC Sample Designation:

MS/MSD: SHHTR-CO-10

Duplicate ID No.:
Associated Sample ID:

Signature(s):

ED_002022B_00026361-00263

Tetra Tech, Inc.

BULK SAMPLE LOG SHEET

Project Site Name: South Helix House (S-0) PCB Investigation
Project No.: 112IG05184

Sample Location: South Helix House
Sampled By: M.Horton / M. Flory
C.O.C. No.:

Samples Collected:
SHHTR-CO-13
SHHTR-CO-14
SHHTR-CO-15
SHHTR-CO-16
SHHTR-CO-17
SHHTR-CO-18

Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLE DATA:

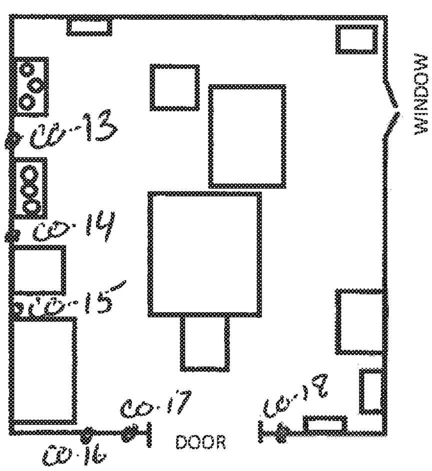
ID	Date	Time	NOTES:	Analysis: RCRA 8 Metals	SVOCs	PCBs
SHHTR-CO-13	8-5-13	1605	collected on left wall, towards back 4' above floor	YES / NO	YES / NO	YES / NO
SHHTR-CO-14	8-5-13	1615	collected center of left wall 1' up	YES / NO	YES / NO	YES / NO
SHHTR-CO-15	8-5-13	1619	collected at door center on left wall 2' up	YES / NO	YES / NO	YES / NO
SHHTR-CO-16	8-5-13	1625	collected door wall left side 1' up	YES / NO	YES / NO	YES / NO
SHHTR-CO-17	8-5-13	1631	collected on door wall left side under light switch	YES / NO	YES / NO	YES / NO
SHHTR-CO-18	8-5-13	1636	collected door wall, right side 1' up	YES / NO	YES / NO	YES / NO

OBSERVATIONS / NOTES:

-collected CO-13 at 4' and CO-14 at 1' because at CO 13 wall at 1' was damaged

- all samples were concrete (wall

MAP:



QC Sample Designation:

MS/MSD

Duplicate ID No.:
Associated Sample ID:

Signature(s):

Tetra Tech, Inc.

BULK SAMPLE LOG SHEET

Page___ of ___

Project Site Name: South Helix House (S-0) PCB Investigation
Project No.: 112IG05184

Sample Location: South Helix House Transfer Room
Sampled By: M.Horton / M. Flory
C.O.C. No.:

Samples Collected:
SHHTR-CO-19
SHHTR-CO-20
SHHTR-CO-21
SHHTR-CO-22
SHHTR-CO-23
SHHTR-CO-24

Type of Sample:
[ ] Low Concentration
[ ] High Concentration

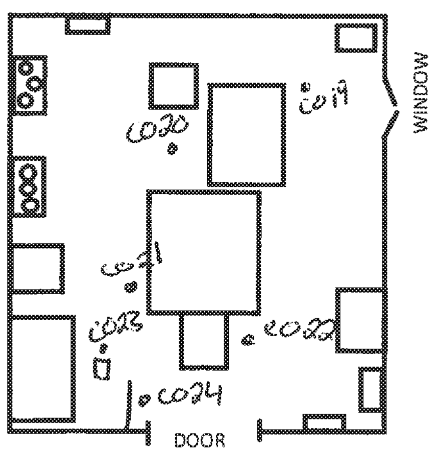
SAMPLE DATA:

ID	Date	Time	NOTES	RCRA 8 Metals	SVOCs	PCBs
SHHTR-CO-19	8-7-13	0931	collected next to transformer pad back right side DUP 02	YES / NO (NO circled)	YES / NO (NO circled)	YES / NO (YES circled)
SHHTR-CO-20	8-7-13	0940	collected in between 3 pieces of equipment in back of room (lab QC)	YES / NO (NO circled)	YES / NO (NO circled)	YES / NO (YES circled)
SHHTR-CO-21	8-7-13	0952	collected left side of big transformer	YES / NO (NO circled)	YES / NO (NO circled)	YES / NO (YES circled)
SHHTR-CO-22	8-7-13	1000	Transformer corner right of the door	YES / NO (NO circled)	YES / NO (NO circled)	YES / NO (YES circled)
SHHTR-CO-23	8-7-13	1008	collected next to floor hole	YES / NO (NO circled)	YES / NO (NO circled)	YES / NO (YES circled)
SHHTR-CO-24	8-7-13	1015	collected next to floor trench DUP 03	YES / NO (NO circled)	YES / NO (NO circled)	YES / NO (YES circled)

OBSERVATIONS / NOTES:

- all samples are concrete (floor)

MAP:



QC Sample Designation:

MS/MSD	Duplicate ID No. / Associated Sample ID	Signature(s)
SHHTR-CO-20	Duplicate ID No.: SHHTR-CO-19 Associated Sample ID: SHHTR-CO-DUP02	[signature]

SHHTR-CO-24
SHHTR-CO-DUP03

Tetra Tech, Inc.

BULK SAMPLE LOG SHEET

Page___ of ___

Project Site Name: South Helix House (S-0) PCB Investigation

Project No.: 112IG05184

Samples Collected: SHHTR-CO-25, SHHTR-CO-26, SHHTR-CO-27, SHHTR-CO-28, SHHTR-CO-29, SHHTR-CO-30

Sample Location: South Helix House Transfer Room

Sampled By: M.Horton / M. Flory

C.O.C. No.:

Type of Sample:
[ ] Low Concentration
[ ] High Concentration

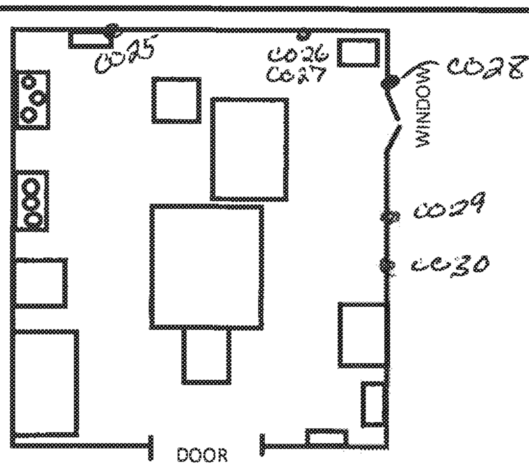
SAMPLE DATA:

ID	Date	Time	NOTES	RCRA 8 Metals	SVOCs	PCBs
SHHTR-CO-25	8-7-13	1025	Back wall, left side, 1' up from floor	NO	NO	YES
SHHTR-CO-26	8-7-13	1033	Back wall, ~~left~~ right side, 1' up from floor	NO	NO	YES
SHHTR-CO-27	8-7-13	1040	Back wall, right side, 4' up from floor	NO	NO	YES
SHHTR-CO-28	8-7-13	1047	right wall, back end, 1' up from floor	NO	NO	YES
SHHTR-CO 29	8-7-13	1053	right wall, middle, 4' up from floor	NO	NO	YES
SHHTR-CO-30	8-7-13	1100	right wall, middle, 1' up from floor	NO	NO	YES

OBSERVATIONS / NOTES:

all samples are concrete (wall)

MAP:



QC Sample Designation:

MS/MSD

Duplicate ID No.:

Associated Sample ID:

Signature(s):

Tetra Tech, Inc.

BULK SAMPLE LOG SHEET

Page___ of ___

Project Site Name: South Helix House (S-0) PCB Investigation
Project No.: 112IG05184

Samples Collected: SHHTR-CO-31, SHHTR-CO-32, SHHTR-CO-33, SHHTR-CO-34, SHHTR-CO-35, SHHTR-CO-36

Sample Location: South Helix House Transfer Room
Sampled By: M.Horton / M. Flory
C.O.C. No.:

Type of Sample:
[ ] Low Concentration
[ ] High Concentration

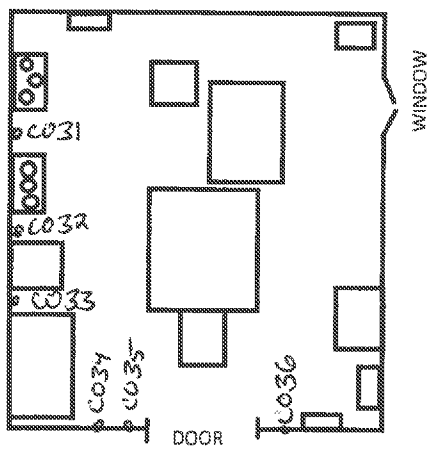
SAMPLE DATA:

ID	Date	Time	NOTES	RCRA 8 Metals	SVOCs	PCBs
SHHTR-CO-31	8-7-13	1107	collected on left wall, back end. 4' above floor Dup04	NO	NO	YES
SHHTR-CO-32	8-7-13	1116	collected on left wall, middle, 2' above floor	NO	NO	YES
SHHTR-CO-33	8-7-13	1123	collected on left wall, middle, 2.5' above floor	NO	NO	YES
SHHTR-CO-34	8-7-13	1130	collected on door wall, left side 1' above floor	NO	NO	YES
SHHTR-CO-35	8-7-13	1137	collected on door wall, left side, 3.5' above floor, beneath light switch	NO	NO	YES
SHHTR-CO-36	8-7-13	1143	collected on door wall, right side, 2.5' above floor	NO	NO	YES

OBSERVATIONS / NOTES:

collected rinsate blank SHHTR-CO-RB02 at 1445
- during shipment to lab both bottles were broken so no analysis was conducted
- all samples are concrete (wall)

MAP:



QC Sample Designation:

MS/MSD: —

Duplicate ID No.: SHHTR-CO-DUP04
Associated Sample ID: SHHTR-CO-31

Signature(s): [signature]

Tetra Tech, Inc.

WIPE SAMPLE LOG SHEET

Project Site Name: South Helix House (S-0) PCB Investigation
Project No.: 112IG05184

Sample Location: South Helix House
Sampled By: M.Horton / M. Flory
C.O.C. No.:

Samples Collected:
SHHTR-WP01
SHHTR-WP-02
SHHTR-WP-03
SHHTR-WP-04
SHHTR-WP-05
SHHTR-WP-06

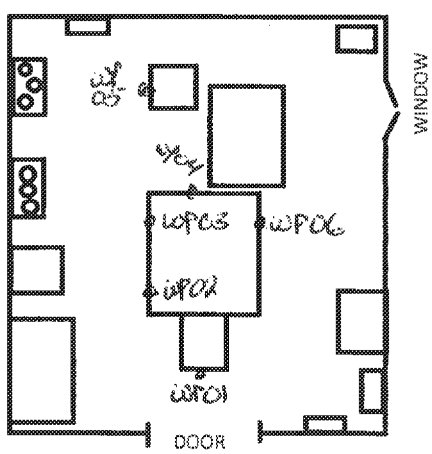
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLE DATA:

ID / Date / Time	NOTES:	Analysis:
ID: SHHTR-WP-01 Date: 8-5-13 Time: 1250	-wipe collected approximately 1' above the floor -Equipment painted grey (see map)	RCRA 8 Metals YES / NO SVOCs YES / NO PCBs YES / NO
ID: SHHTR-WP-02 Date: 8-5-13 Time: 1258	-wipe collected approximately 1.5' above bottom edge of equipment box (see map)	RCRA 8 Metals YES / NO SVOCs YES / NO PCBs YES / NO
ID: SHHTR-WP-03 Date: 8-5-13 Time: 1301	-wipe collected approximately 1.5' above bottom edge of of equipment box (see map)	RCRA 8 Metals YES / NO SVOCs YES / NO PCBs YES / NO
ID: SHHRT-WP-04 Date: 8-5-13 Time: 1304	-wipe collected approximately 1.5' above bottom edge of equipment box on removable panel (see map) DUP01	RCRA 8 Metals YES / NO SVOCs YES / NO PCBs YES / NO
ID: SHHRT-WP-05 Date: 8-5-13 Time: 1309	-wipe collected approximately 8' above floor (see map)	RCRA 8 Metals ~~YES~~ / NO SVOCs ~~YES~~ / NO PCBs ~~YES~~ / NO
ID: ~~SHHRT~~ SHHTR-WP06 Date: 8-5-13 Time: 1312	-wipe collected approximately 1.5' above bottom of equipment box (see map)	RCRA 8 Metals YES / NO SVOCs YES / NO PCBs YES / NO

OBSERVATIONS / NOTES:

MAP:



QC Sample Designation:

MS/MSD

Duplicate ID No.: SHHTR-WP DUP01
Associated Sample ID: SHHTR-WP-04

Signature(s):

Tetra Tech, Inc.

WIPE SAMPLE LOG SHEET

Project Site Name: South Helix House (S-0) PCB Investigation
Project No.: 112IG05184

Sample Location: South Helix House Transfer Room
Sampled By: M.Horton / M. Flory
C.O.C. No.:

Samples Collected:
SHHTR-WP-07
SHHTR-WP-08
SHHTR-WP-09
SHHTR-WP-10

Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLE DATA:

ID: SHHTR-WP-07	NOTES: Analysis:	RCRA 8 Metals YES / NO
Date: 8-5-13	-Sample collected approximately 1.5' above bottom of equipment (see map)	SVOCs YES / NO
Time: 1315		PCBs YES / NO

ID: SHHTR-WP-08	NOTES: Analysis:	RCRA 8 Metals YES / NO
Date: 8-5-13	Sample collected approximately 8" above floor on equipment (see map)	SVOCs YES / NO
Time: 1318		PCBs YES / NO

ID: SHHTR-WP-09	NOTES: Analysis:	RCRA 8 Metals YES / NO
Date: 8-5-13	Sample collected approximately 8" above floor on panel closest to door (see map) (Lab QC)	SVOCs YES / NO
Time: 1321		PCBs YES / NO

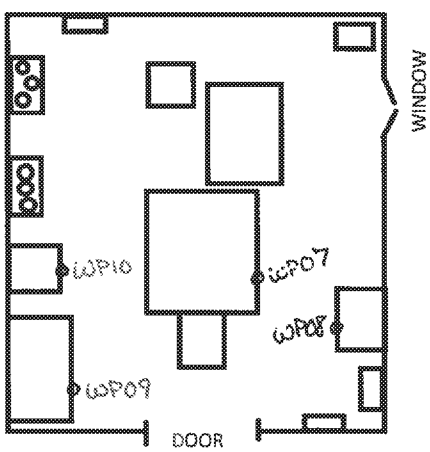
ID: SHHTR-WP-10	NOTES: Analysis:	RCRA 8 Metals YES / NO
Date: 8-5-13	Sample collected beneath "auto/main" switch (see map)	SVOCs YES / NO
Time: 1326		PCBs YES / NO

ID:	NOTES: Analysis:	RCRA 8 Metals YES / NO
Date:		SVOCs YES / NO
Time:		PCBs YES / NO

ID:	NOTES: Analysis:	RCRA 8 Metals YES / NO
Date:		SVOCs YES / NO
Time:		PCBs YES / NO

OBSERVATIONS / NOTES:

MAP:



QC Sample Designation:

MS/MSD: SHHTR-WP-09

Duplicate ID No.:
Associated Sample ID:

Signature(s):

Tetra Tech, Inc.

WIPE SAMPLE LOG SHEET

Project Site Name: South Helix House (S-0) PCB Investigation
Project No.: 112IG05184

Sample Location: South Helix House Transfer Room
Sampled By: M.Horton / M. Flory
C.O.C. No.:

Samples Collected:
SHHTR-WP-11
SHHTR-WP-12
SHHTR-WP-13
SHHTR-WP-14
SHHTR-WP-15
SHHTR-WP-16

Type of Sample:
[ ] Low Concentration
[ ] High Concentration

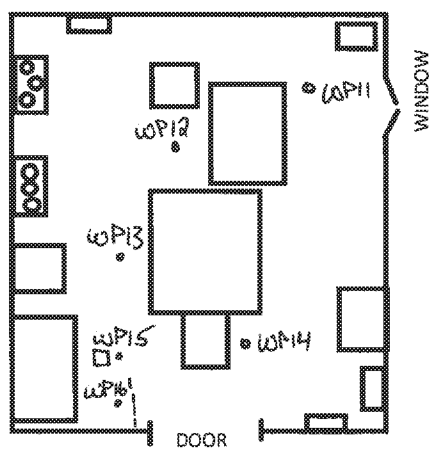
SAMPLE DATA:

ID	Date	Time	NOTES	Analysis: RCRA 8 Metals	SVOCs	PCBs
SHHTR-WP-11	8-7-13	0810	collected on floor 8" to the right of the transformer pad (see map)	NO	NO	YES
SHHTR-WP-12	8-7-13	0813	collected on floor in center of the 3 middle pieces of electrical equipment (see map) DUP02	NO	NO	YES
SHHTR-WP-13	8-7-13	0816	collected on floor on the left side of center transformer (see map)	NO	NO	YES
SHHTR-WP-14	8-7-13	0818	collected on floor on right side of large center transformer (see map)	NO	NO	YES
SHHTR-WP-15	8-7-13	0821	collected on floor at hole left of door (see map) (Lab QC)	NO	NO	YES
SHHTR-WP-16	8-7-13	0824	collected on left side of floor trench to the left of door (see map)	NO	NO	YES

OBSERVATIONS / NOTES:

collected SHHTR-WP-FB02 8-7-13 at 1450

MAP:



QC Sample Designation:

MS/MSD: SHHTR-WP-15

Duplicate ID No.: SHHTR-WP-DUP02
Associated Sample ID: SHHTR-WP-12

Signature(s):

Tetra Tech, Inc.

WIPE SAMPLE LOG SHEET

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Project Site Name: South Helix House (S-0) PCB Investigation
Project No.: 112IG05184

Samples Collected:
SHHTR-WP-17
SHHTR-WP-18
SHHTR-WP-19
SHHTR-WP-20
SHHTR-WP-21
SHHTR-WP-22

Sample Location: South Helix House Transfer Room
Sampled By: M.Horton / M. Flory
C.O.C. No.:

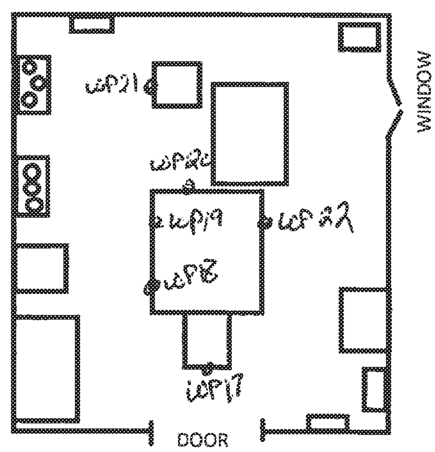
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLE DATA:

ID / Date / Time	NOTES:	Analysis:
ID: SHHTR-WP-17 Date: 8-7-13 Time: 0827	- collected front of first piece of electrical equipment in front of door - 5' off floor (see map)	RCRA 8 Metals YES / NO (NO circled) SVOCs YES / NO (NO circled) PCBs YES / NO (YES circled)
ID: SHHTR-WP-18 Date: 8-7-13 Time: 0830	- collected left side of large transformer 1' up from bottom of equipment (see map)	RCRA 8 Metals YES / NO (NO circled) SVOCs YES / NO (NO circled) PCBs YES / NO (YES circled)
ID: SHHTR-WP-19 Date: 8-7-13 Time: 0833	- left side of large transformer - 1' up from bottom of equipment (see map)	RCRA 8 Metals YES / NO (NO circled) SVOCs YES / NO (NO circled) PCBs YES / NO (YES circled)
ID: SHHTR-WP-20 Date: 8-7-13 Time: 0835	- Back side of large transformer - 1' up from bottom of equipment on removable panel (see map)	RCRA 8 Metals YES / NO (NO circled) SVOCs YES / NO (NO circled) PCBs YES / NO (YES circled)
ID: SHHTR-WP-21 Date: 8-7-13 Time: 0837	collected left side of back piece of equipment beneath bottom switches (see map)	RCRA 8 Metals YES / NO (NO circled) SVOCs YES / NO (NO circled) PCBs YES / NO (YES circled)
ID: SHHTR-WP-22 Date: 8-7-13 Time: 0840	collected back right side of large transformer 1' up from bottom of equipment (see map)	RCRA 8 Metals YES / NO (NO circled) SVOCs YES / NO (NO circled) PCBs YES / NO (YES circled)

OBSERVATIONS / NOTES:

MAP:



QC Sample Designation:

MS/MSD

Duplicate ID No.:
Associated Sample ID:

Signature(s):

Tetra Tech, Inc.

WIPE SAMPLE LOG SHEET

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Project Site Name: South Helix House (S-0) PCB Investigation
Project No.: 112IG05184

Sample Location: South Helix House Transfer Room
Sampled By: M.Horton / M. Flory
C.O.C. No.:

Samples Collected:
SHHTR-WP-23
SHHTR-WP-24
SHHTR-WP-25
SHHTR-WP-26
SHHTR-WP-27
SHHTR-WP-28

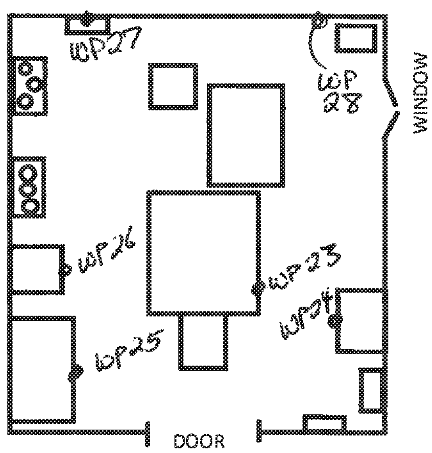
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLE DATA:

ID / Date / Time	NOTES:	Analysis:
ID: SHHTR-WP23 Date: 8-7-13 Time: 0843	collected right side of large transformer 1' up from bottom of equipment (see map) DUP03	RCRA 8 Metals YES / NO (NO circled) SVOCs YES / NO (NO circled) PCBs YES / NO (YES circled)
ID: SHHTR-WP-24 Date: 8-7-13 Time: 0846	collected front of right transformer 1' up from floor (see map)	RCRA 8 Metals YES / NO (NO circled) SVOCs YES / NO (NO circled) PCBs YES / NO (YES circled)
ID: SHHTR-WP-25 Date: 8-7-13 Time: 0850	collected front of left wall transformer closest to door wall ~ 1' up from floor (see map)	RCRA 8 Metals YES / NO (NO circled) SVOCs YES / NO (NO circled) PCBs YES / NO (YES circled)
ID: SHHTR-WP-26 Date: 8-7-13 Time: 0853	collected from front of second panel on left wall above Auto/Max switch (see map)	RCRA 8 Metals YES / NO (NO circled) SVOCs YES / NO (NO circled) PCBs YES / NO (YES circled)
ID: SHHTR-WP-27 Date: 8-7-13 Time: 0857	collected left side of back wall 1' up (see map)	RCRA 8 Metals YES / NO (NO circled) SVOCs YES / NO (NO circled) PCBs YES / NO (YES circled)
ID: SHHTR-WP-28 Date: 8-7-13 Time: 0859	collected back wall right side 1' up (see map)	RCRA 8 Metals YES / NO (NO circled) SVOCs YES / NO (NO circled) PCBs YES / NO (YES circled)

OBSERVATIONS / NOTES:

MAP:



QC Sample Designation:

MS/MSD	Duplicate ID No.: SHHTR-WP-DUP03 Associated Sample ID: SHHTR-WP-23	Signature(s): [signature]

Tetra Tech, Inc.

WIPE SAMPLE LOG SHEET

Page___ of ___

Project Site Name: South Helix House (S-0) PCB Investigation
Project No.: 112IG05184

Samples Collected:
SHHTR-WP-29
SHHTR-WP-30
SHHTR-WP-31
SHHTR-WP-32
SHHTR-WP-33
SHHTR-WP-34

Sample Location: South Helix House Transfer Room
Sampled By: M.Horton / M. Flory
C.O.C. No.:

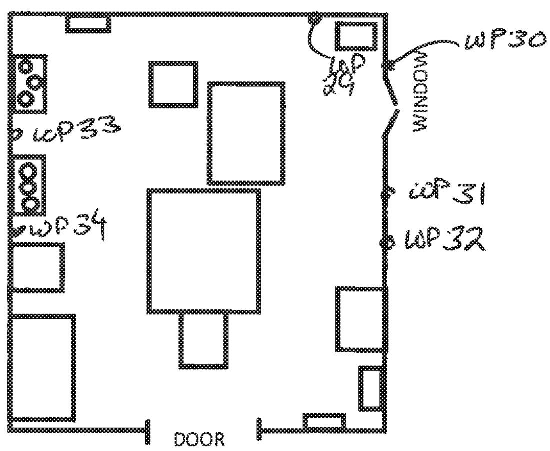
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLE DATA:

ID	Date	Time	NOTES	Analysis: RCRA 8 Metals	SVOCs	PCBs
SHHTR-WP-29	8-7-13	0901	collected back wall - right side 4' up (~~wipe~~ see map)	YES / NO	YES / NO	YES / NO
SHHTR-WP30	8-7-13	0903	right wall, back end, 1' up (see map)	YES / NO	YES / NO	YES / NO
SHHTR-WP-31	8-7-13	0905	right wall, middle, 4' up (Lab QC) (see map)	YES / NO	YES / NO	YES / NO
SHHTR-WP 32	8-7-13	0907	right wall, middle, 1' up (see map)	YES / NO	YES / NO	YES / NO
SHHTR-WP-33	8-7-13	0911	left wall, back end, 4' up (see map)	YES / NO	YES / NO	YES / NO
SHHTR-WP-34	8-7-13	0913	left wall, middle, 1' up (see map)	YES / NO	YES / NO	YES / NO

OBSERVATIONS / NOTES:

MAP:



QC Sample Designation:

MS/MSD

Duplicate ID No.:
Associated Sample ID:

Signature(s):

Tetra Tech, Inc.

WIPE SAMPLE LOG SHEET

Page___ of ___

Project Site Name: South Helix House (S-0) PCB Investigation
Project No.: 112IG05184

Sample Location: South Helix House Transfer Room
Sampled By: M.Horton / M. Flory
C.O.C. No.:

Samples Collected:
SHHTR-WP-35
SHHTR-WP-36
SHHTR-WP-37
SHHTR-WP-38

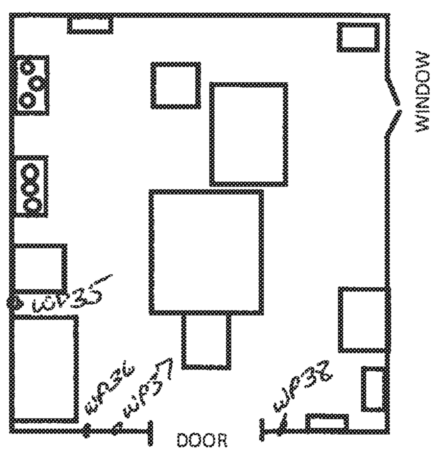
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLE DATA:

ID / Date / Time	NOTES:	Analysis:
ID: SHHTR-WP-35 Date: 8-7-13 Time: 0915	- collected left wall, door end, 2' up from floor (see map) DUP04	RCRA 8 Metals YES / NO (NO circled) SVOCs YES / NO (NO circled) PCBs YES / NO (YES circled)
ID: SHHTR-WP-36 Date: 8-7-13 Time: 0918	door wall, left side, 1' up from floor (see map)	RCRA 8 Metals YES / NO (NO circled) SVOCs YES / NO (NO circled) PCBs YES / NO (YES circled)
ID: SHHTR-WP-37 Date: 8-7-13 Time: 0921	door wall, left side, 4' up from floor next to fire alarm (see map)	RCRA 8 Metals YES / NO (NO circled) SVOCs YES / NO (NO circled) PCBs YES / NO (YES circled)
ID: SHHTR-WP-38 Date: 8-7-13 Time: 0923	door wall, right side, 1' up, beneath fire extuinguisher (see map)	RCRA 8 Metals YES / NO (NO circled) SVOCs YES / NO (NO circled) PCBs YES / NO (YES circled)
ID: Date: Time:		RCRA 8 Metals YES / NO SVOCs YES / NO PCBs YES / NO
ID: Date: Time:		RCRA 8 Metals YES / NO SVOCs YES / NO PCBs YES / NO

OBSERVATIONS / NOTES:

MAP:



QC Sample Designation:

MS/MSD

Duplicate ID No.: SHHTR-WP-DUP04
Associated Sample ID: SHHTR-WP-35

Signature(s):

Tetra Tech, Inc.

BULK SAMPLE LOG SHEET

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Project Site Name: South Helix House (S-0) PCB Investigation
Project No.: 112IG05184
Samples Collected: SHHTR-~~SP~~ CA-01
SHHTR-CA-02
SHHTR-CA-03
SHHTR-CA-04
SHHTR-SD-01
SHHTR-SD-02

Sample Location: South Helix House
Sampled By: M.Horton / M. Flory
C.O.C. No.:

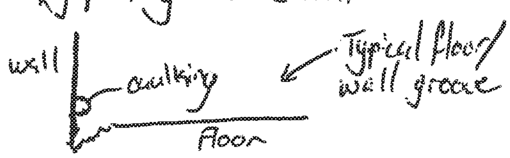
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLE DATA:

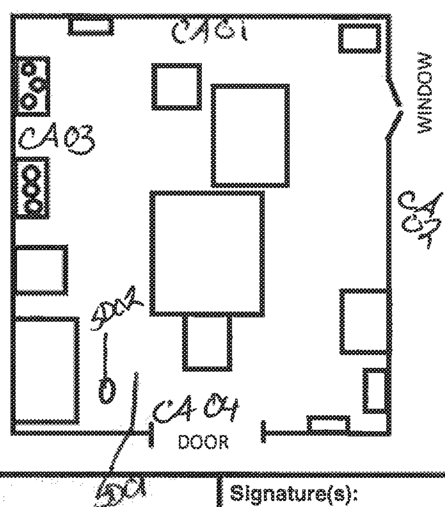
ID	Date	Time	NOTES	RCRA 8 Metals	SVOCs	PCBs
SHHTR-CA-01	8-5-13	1335	-sample comprised of entire wall length -did not cut caulking - just pulled off wall (Lab QC)	YES / NO (NO circled)	YES / NO (NO circled)	YES / NO (YES circled)
SHHTR-CA-02	8-5-13	1346	-Sample collected as composite of wall small amount available	YES / NO (NO circled)	YES / NO (NO circled)	YES / NO (YES circled)
SHHTR-CA-03	~~CA-03~~	1352	-sample collected as composite of wall - small volume available	YES / NO (NO circled)	YES / NO (NO circled)	YES / NO (YES circled)
SHHTR-CA-04	8-5-13	1358	-Sample collected from within 2' on either side of the door - very little volume	YES / NO (NO circled)	YES / NO (NO circled)	YES / NO (YES circled)
SHHPR-SD01	8-5-13	1408	sediment collected from floor groove at the wall. hole appears to go all the way through the foundation - gravel moving on outside during collection - (F-M) silty sand	YES / NO (NO circled)	YES / NO (NO circled)	YES / NO (YES circled)
SHHTR-SD-02	8-5-13	1415	-sediment collected from hole next to trench -probed 6" down - still soft - sample 0-5" -(F-M) silty sand	YES / NO (NO circled)	YES / NO (NO circled)	YES / NO (YES circled)

OBSERVATIONS / NOTES:

- insufficient volume on walls for Duplicate sample
- along most of the wall it appears that a groove was cut out of the floor (below the caulking)
- almost all caulking was removed by simply pulling off the wall



MAP:



CA - Caulking Sample
SD - Sediment / Soil Sample

QC Sample Designation:

MS/MSD: CA-01

Duplicate ID No.: Not enough volume

Associated Sample ID:

Signature(s):

SPECTRUM ANALYTICAL, INC.
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CHAIN OF CUSTODY RECORD

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☐ 8405 Benjamin Road, Ste A, Tampa, FL 33634, (813) 888-9507
☐ 646 Camp Avenue, N Kingstown, RI 02852, (401) 732-3400

Special Handling:

TAT- Indicate Date Needed: ______

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- Samples disposed of after 60 days unless otherwise instructed.

Report To: Tri Eco/Tetra Tech
Jim Farrell
250 Andover St Suite 200
Wilmington MA 01887
Telephone #: (978) 474-8412
Project Mgr. Jim Farrell

Invoice To: See Spec

P.O. No.: ______ RQN: ______

Project No.: 112IG05184
Site Name: South Helix House Transfer Room
Location: Cutler State: ME
Sampler(s): M. Horton M. Dory

1=$Na_2S_2O_3$ 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid 7=CH_3OH
8= $NaHSO_4$ 9= Deionized Water 10=H_3PO_4 11= Hexane 12= ______

List preservative code below: 11

QA/QC Reporting Notes:

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW= Surface Water SO=Soil SL=Sludge A=Air
X1= Wipe X2= ______ X3= ______

G=Grab C=Composite

QA/QC Reporting Level

☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other ______

State-specific reporting standards:

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic		PCBs								
	SHHTR-WP-01	8-5-13	1250	X1	G		1				X								
	SHHTR-WP-02	↓	1258	↓	↓		1				X								
	SHHTR-WP-03	↓	1301	↓	↓		1				X								
	SHHTR-WP-04	↓	1304	↓	↓		1				X								
	SHHTR-WP-05	↓	1309	↓	↓		1				X								
	SHHTR-WP-06	↓	1312	↓	↓		1				X								
	SHHTR-WP-07	↓	1315	↓	↓		1				X								
	SHHTR-WP-08	↓	1318	↓	↓		1				X								
	SHHTR-WP-09	↓	1321	↓	↓		3				X								Lab QC
	SHHTR-WP-10	↓	1326	↓	↓		1				X								

Relinquished by:	Received by:	Date:	Time:	Temp °C
Michael Horton [signature]	FedEx	8-8-13	1400	

☐ EDD Format ______
☐ E-mail to ______

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

CHAIN OF CUSTODY RECORD

SPECTRUM ANALYTICAL, INC.
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(413) 789-9018

☐ 8405 Benjamin Road, Ste A
Tampa, FL 33634
(813) 888-9507

☐ 646 Camp Avenue
N Kingstown, RI 02852
(401) 732-3400

Special Handling:

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Report To: Tri Eco/TetraTech

SEE PAGE ONE

Telephone #:

Project Mgr.

Invoice To:

SEE PAGE ONE

P.O. No.: RQN:

Project No.: 112IG05184

Site Name: South Helix House Transfer Room

Location: Cutler State: ME

Sampler(s): M. Horton M Flory

1=$Na_2S_2O_3$ 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid 7=CH_3OH
8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11= Hexane 12= 4°C

List preservative code below: 11/12

QA/QC Reporting Notes:

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
X1= Wipe X2= Caulking X3= Concrete

G=Grab C=Composite

QA/QC Reporting Level

☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other

State-specific reporting standards:

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic		PCBs							
	SHHTR-WP-DUP01	8-5-13	—	X1	G		1				X							SHHTR-WP-04
	SHHTR-CA-01		1335	X2	C		2				X							Lab QC
	SHHTR-CA-02		1346				1				X							
	SHHTR-CA-03		1352				1				X							
	SHHTR-CA-04		1358				1				X							
	SHHTR-CO-01		1430	X3	C		1				X							
	SHHTR-CO-02		1440				1				X							
	SHHTR-CO-03		1448				1				X							
	SHHTR-CO-04		1500				1				X							
	SHHTR-CO-05		1507				1				X							

Relinquished by:	Received by:	Date:	Time:	Temp°C
Michael Horton	Fed Ex	8-8-13	1400	

☐ EDD Format

☐ E-mail to

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

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Special Handling:

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Report To: Tri Eco/Tetra Tech

SEE PAGE ONE

Telephone #:

Project Mgr.

Invoice To:

SEE PAGE ONE

P.O. No.: RQN:

Project No.: 112IG05184

Site Name: South Helix House Transfer Room

Location: Cutler State: ME

Sampler(s): M. Horton M. Flory

1=$Na_2S_2O_3$ 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid 7=CH_3OH
8= $NaHSO_4$ 9= Deionized Water 10=H_3PO_4 11= 4°C 12=

List preservative code below: 11

QA/QC Reporting Notes:

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW= Surface Water SO=Soil SL=Sludge A=Air
X1= Concrete X2= X3=

G=Grab C=Composite

QA/QC Reporting Level

☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other

State-specific reporting standards:

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic		PCBs							QA/QC Notes
	SHHTR-CO-06	8-5-13	1514	~~G~~C	X1		1				X							
	SHHTR-CO-DUP01		—				1				X							SHHTR-CO-03
	SHHTR-CO-07		1525				1				X							
	SHHTR-CO-08		1533				1				X							
	SHHTR-CO-09		1539				1				X							
	SHHTR-CO-10		1547				2				X							Lab QC
	SHHTR-CO-11		1554				1				X							
	SHHTR-CO-12		1600				1				X							
	SHHTR-CO-13		1605				1				X							
	SHHTR-CO-14		1615				1				X							

Relinquished by:	Received by:	Date:	Time:	Temp°C
Michael Horton	FedEx	8-8-13	1400	

☐ EDD Format

☐ E-mail to

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

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Special Handling:

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Report To: Tri Eco/Tetra Tech
SEE PAGE ONE
Telephone #:
Project Mgr.

Invoice To:
SEE PAGE ONE
P.O. No.: RQN:

Project No.: 112IG05184
Site Name: South Helix House Transfer Room
Location: Cutler State: ME
Sampler(s): M. Horton M. Flory

1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid 7=CH_3OH
8= $NaHSO_4$ 9= Deionized Water 10=H_3PO_4 11= Hexane 12= 4°C

List preservative code below: 12 11

QA/QC Reporting Notes:

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW= Surface Water SO=Soil SL=Sludge A=Air
X1= Concrete X2= X3=

G=Grab C=Composite

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other

State-specific reporting standards:

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic		PCBs	PCBs						
	SHHTR-CO-15	8-5-13	1619	C	X1		1				X							
	SHHTR-CO-16	↓	1625	↓	↓		1				X							
	SHHTR-CO-17	↓	1631	↓	↓		1				X							
	SHHTR-CO-18	↓	1636	↓	↓		1				X							
	SHHTR-WP-FB01	8-6-13	1045	QC	QC		1					X						
	SHHTR-CA-RB01	↓	1205	QC	AQ		2				X							
	SHHTR-CO-RB01	↓	1215	QC	AQ		2				X							
	SHHTR-SO-01	8-5-13	1408	G	SO		1				X							
	SHHTR-SO-02	8-5-13	1415	G	SO		1				X							

Relinquished by:	Received by:	Date:	Time:	Temp°C
Michael Horton	FedEx	8-8-13	1400	

☐ EDD Format
☐ E-mail to

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

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Special Handling:

TAT- Indicate Date Needed: ______
- All TATs subject to laboratory approval. Min. 24-hour notification needed for rushes.
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Report To: Tri Eco/Tetra Tech
SEE PAGE ONE
Telephone #:
Project Mgr.

Invoice To:
SEE PAGE ONE
P.O. No.: RQN:

Project No.: 112IG05184
Site Name: South Helix House Transfer Room
Location: Cutler State: ME
Sampler(s): M. Horton M. Flory

1=$Na_2S_2O_3$ 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid 7=CH_3OH
8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11=Hexane 12=

List preservative code below: 11

QA/QC Reporting Notes:

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
X1=Wipe X2= X3=

G=Grab C=Composite

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other ______
State-specific reporting standards:

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	PCBs								QA/QC Reporting Notes
	SHHTR-WP-11	8-7-13	0810	G	X1		1			X								
	SHHTR-WP-12	↓	0813	↓	↓		1			X								
	SHHTR-WP-DUP02		—				1			X								SHHTR-12
	SHHTR-WP-13		0816				1			X								
	SHHTR-WP-14		0818				1			X								
	SHHTR-WP-15		0821				3			X								Lab QC
	SHHTR-WP-16		0824				1			X								
	SHHTR-WP-~~18~~17		0827				1			X								
	SHHTR-WP-18		0830				1			X								
	SHHTR-WP-19	↓	0833	↓	↓		1			X								

Relinquished by:	Received by:	Date:	Time:	Temp°C
Michael Horton [signature]	FedEx	8-8-13	1400	

☐ EDD Format ______
☐ E-mail to ______

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

SPECTRUM ANALYTICAL, INC.
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CHAIN OF CUSTODY RECORD

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☐ 8405 Benjamin Road, Ste A, Tampa, FL 33634, (813) 888-9507
☐ 646 Camp Avenue, N Kingstown, RI 02852, (401) 732-3400

Special Handling:

TAT- Indicate Date Needed: ____________

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- Samples disposed of after 60 days unless otherwise instructed.

Report To: Tri Eco/Tetra Tech
SEE PAGE ONE
Telephone #:
Project Mgr.

Invoice To:
SEE PAGE ONE
P.O. No.: RQN:

Project No.: 112G05184
Site Name: South Helix House Transfer Room
Location: Cutler State: ME
Sampler(s): M. Horton M. Flory

1=$Na_2S_2O_3$ 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid 7=CH_3OH
8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11= Hexane 12=

List preservative code below: 11

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
X1= Wipe X2= X3=

G=Grab C=Composite

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic		PCBs							QA/QC Reporting Notes
	SHHTR-WP-20	8-7-13	0835	G	X1		1				X							
	SHHTR-WP-21	↓	0837	↓	↓		1				X							
	SHHTR-WP-22		0840				1				X							
	SHHTR-WP-23		0843				1				X							
	SHHTR-WP-24		0846				1				X							
	SHHTR-WP-DUP03		—				1				X							SHHTR-WP-23
	SHHTR-WP-25		0850				1				X							
	SHHTR-WP-26		0853				1				X							
	SHHTR-WP-27		0857				1				X							
	SHHTR-WP-28	↓	0859	↓	↓		1				X							

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other ________
State-specific reporting standards: ________

Relinquished by:	Received by:	Date:	Time:	Temp°C
Michael Horton [signature]	Fed Ex	8-8-13	1400	

☐ EDD Format ________
☐ E-mail to ________

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

CHAIN OF CUSTODY RECORD

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Report To: Tri Eco/Tetra Tech
SEE PAGE ONE
Telephone #:
Project Mgr.

Invoice To:
SEE PAGE ONE
P.O. No.: RQN:

Project No.: ~~~~ 112IG05184
Site Name: South Helix House Transfer Room
Location: Cutler State: ME
Sampler(s): M. Horton M. Floy

1=$Na_2S_2O_3$ 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid 7=CH_3OH
8= $NaHSO_4$ 9= Deionized Water 10=H_3PO_4 11= Hexane 12=

List preservative code below: 11

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW= Surface Water SO=Soil SL=Sludge A=Air
X1= Wipe X2= X3=

G=Grab C=Composite

QA/QC Reporting Notes:

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other ______

State-specific reporting standards:

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	PCBs								Notes
	SHHTR-WP-29	8-7-13	0901	G	X1		1			X								
	SHHTR-WP-30		0903				1			X								
	SHHTR-WP-31		0905				3			X								Lab QC
	SHHTR-WP-32		0909				1			X								
	SHHTR-WP-33		0911				1			X								
	SHHTR-WP-34		0913				1			X								
	SHHTR-WP-35		0915				1			X								
	SHHTR-WP-DUP04						1			X								SHHTR-WP-35
	SHHTR-WP-36		0918				1			X								
	SHHTR-WP-37		0921				1			X								

Relinquished by:	Received by:	Date:	Time:	Temp°C
Michael Horton	Fed Ex	8-8-13	1400	

☐ EDD Format ______
☐ E-mail to ______

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

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Report To: TriEco/Tetra Tech
SEE PAGE ONE
Telephone #:
Project Mgr.

Invoice To: SEE PAGE ONE
P.O. No.: RQN:

Project No.: 112IG05184
Site Name: South Hadix House Transfer Room
Location: Cutler State: ME
Sampler(s): M. Horton M. Flory

1=$Na_2S_2O_3$ 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid 7=CH_3OH
8= $NaHSO_4$ 9= Deionized Water 10=H_3PO_4 11= Hexane 12= 4°C

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW= Surface Water SO=Soil SL=Sludge A=Air
X1= Wipe X2= Concrete X3=

G=Grab C=Composite

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	PCBs	PCBs							QA/QC Reporting Notes:
List preservative code below:										11	12							
	SHHTR-WP-38	8-7-13	0923	G	X1		1			X								
	SHHTR-WP-FB02	↓	1450	↓	↓		1			X								
	SHHTR-CO-19		0931	C	X2		1				X							
	SHHTR-CO-20		0940				2				X							Lab QC
	SHHTR-CO-21		0952				1				X							
	SHHTR-CO-22		1000				1				X							
	SHHTR-CO-23		1008				1				X							
	SHHTR-CO-24		1015				1				X							
	SHHTR-CO-DUP03		—				1				X							SHHTR-CO-24
	SHHTR-CO-DUP02	↓	—	↓	↓		1				X							SHHTR-CO-19

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other ____________
State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:	Temp°C
Michael Horton [signature]	Fed Ex	8-8-13	1400	

☐ EDD Format
☐ E-mail to

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

CHAIN OF CUSTODY RECORD

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Report To: TriEco/TetraTech
SEE PAGE ONE
Telephone #:
Project Mgr.

Invoice To:
SEE PAGE ONE
P.O. No.: RQN:

Project No.: 112IG05184
Site Name: South Helix House Transfer Room
Location: Cutler State: ME
Sampler(s): M. Horton M. Flory

1=$Na_2S_2O_3$ 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid 7=CH_3OH
8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11= 4°C 12=

List preservative code below: 11

QA/QC Reporting Notes:

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
X1= Concrete X2= X3=

G=Grab C=Composite

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other ______
State-specific reporting standards:

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	PCBs	Notes
	SHHTR-CO-25	8-7-13	1025	C	X1		1			X	
	SHHTR-CO-26	↓	1033	↓	↓		1			X	
	SHHTR-CO-27	↓	1040	↓	↓		1			X	
	SHHTR-CO-28	↓	1047	↓	↓		1			X	
	SHHTR-CO-29	↓	1053	↓	↓		1			X	
	SHHTR-CO-30	↓	1100	↓	↓		1			X	
	SHHTR-CO-31	↓	1107	↓	↓		1			X	
	SHHTR-CO-32	↓	1116	↓	↓		1			X	
	SHHTR-CO-33	↓	1123	↓	↓		1			X	
	SHHTR-CO-DUP04	↓	—	↓	↓		1			X	SHHTR-CO-31

Relinquished by:	Received by:	Date:	Time:	Temp°C
Michael Horton	Fed Ex	8-8-13	1400	

☐ EDD Format ______
☐ E-mail to ______

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

SPECTRUM ANALYTICAL, INC.
Featuring
HANIBAL TECHNOLOGY

CHAIN OF CUSTODY RECORD

☐ 11 Almgren Drive, Agawam, MA 01001, (413) 789-9018
☐ 8405 Benjamin Road, Ste A, Tampa, FL 33634, (813) 888-9507
☐ 646 Camp Avenue, N Kingstown, RI 02852, (401) 732-3400

Special Handling:

TAT- Ind icate Date Needed: ____
- All TATs subject to laboratory approval. Min. 24-hour notification needed for rushes.
- Samples disposed of after 60 days unless otherwise instructed.

Report To: Tri Eco/Tetra Tech
SEE PAGE ONE
Telephone #:
Project Mgr.

Invoice To:
SEE PAGE ONE
P.O. No.: RQN:

Project No.: 112IG05184
Site Name: South Helix House Transfer Room
Location: Cutler State: ME
Sampler(s): M. Horton M. Flory

1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid 7=CH_3OH
8= $NaHSO_4$ 9= Deionized Water 10=H_3PO_4 11= 4°C 12=

List preservative code below: 11

QA/QC Reporting Notes:

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW= Surface Water SO=Soil SL=Sludge A=Air
X1= concrete X2= X3=

G=Grab C=Composite

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other

State-specific reporting standards:

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic		PCBs
	SHHTR-CO-34	8-7-13	1130	C	X1		1				1
	SHHTR-CO-35	↓	1137	↓	↓		1				1
	SHHTR-CO-36	↓	1143	↓	↓		1				1
	SHHTR-CO-RB02	↓	1445	QC	AQ		2				1

Relinquished by:	Received by:	Date:	Time:	Temp°C
Michael Horton	Fed Ex	8-8-13	1400	

☐ EDD Format
☐ E-mail to

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

Revised Feb 2013

ED_002022B_00026361-00285

Appendix C: Laboratory Analytical Reports

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-01 **Project:** CTO-X039, WIPES
Lab ID: M1374-01 **Collection Date:** 08/05/13 12:50

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1.0	ug/wipe	1	08/14/2013 16:16	73135
Aroclor-1221	ND		1.0	ug/wipe	1	08/14/2013 16:16	73135
Aroclor-1232	ND		1.0	ug/wipe	1	08/14/2013 16:16	73135
Aroclor-1242	ND		1.0	ug/wipe	1	08/14/2013 16:16	73135
Aroclor-1248	ND		1.0	ug/wipe	1	08/14/2013 16:16	73135
Aroclor-1254	ND		1.0	ug/wipe	1	08/14/2013 16:16	73135
Aroclor-1260	2.2		1.0	ug/wipe	1	08/14/2013 16:16	73135
Surrogate: Tetrachloro-m-xylene	72.4		50-138	%REC	1	08/14/2013 16:16	73135
Surrogate: Decachlorobiphenyl	75.9		65-169	%REC	1	08/14/2013 16:16	73135

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-02
Lab ID: M1374-02
Project: CTO-X039, WIPES
Collection Date: 08/05/13 12:58

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1.0	ug/wipe	1	08/14/2013 16:34	73135
Aroclor-1221	ND		1.0	ug/wipe	1	08/14/2013 16:34	73135
Aroclor-1232	ND		1.0	ug/wipe	1	08/14/2013 16:34	73135
Aroclor-1242	ND		1.0	ug/wipe	1	08/14/2013 16:34	73135
Aroclor-1248	ND		1.0	ug/wipe	1	08/14/2013 16:34	73135
Aroclor-1254	ND		1.0	ug/wipe	1	08/14/2013 16:34	73135
Aroclor-1260	1.2		1.0	ug/wipe	1	08/14/2013 16:34	73135
Surrogate: Tetrachloro-m-xylene	81.2		50-138	%REC	1	08/14/2013 16:34	73135
Surrogate: Decachlorobiphenyl	81.4		65-169	%REC	1	08/14/2013 16:34	73135

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-03 **Project:** CTO-X039, WIPES
Lab ID: M1374-03 **Collection Date:** 08/05/13 13:01

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1.0	ug/wipe	1	08/14/2013 16:52	73135
Aroclor-1221	ND		1.0	ug/wipe	1	08/14/2013 16:52	73135
Aroclor-1232	ND		1.0	ug/wipe	1	08/14/2013 16:52	73135
Aroclor-1242	ND		1.0	ug/wipe	1	08/14/2013 16:52	73135
Aroclor-1248	ND		1.0	ug/wipe	1	08/14/2013 16:52	73135
Aroclor-1254	ND		1.0	ug/wipe	1	08/14/2013 16:52	73135
Aroclor-1260	ND		1.0	ug/wipe	1	08/14/2013 16:52	73135
Surrogate: Tetrachloro-m-xylene	80.0		50-138	%REC	1	08/14/2013 16:52	73135
Surrogate: Decachlorobiphenyl	78.9		65-169	%REC	1	08/14/2013 16:52	73135

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-04
Lab ID: M1374-04
Project: CTO-X039, WIPES
Collection Date: 08/05/13 13:04

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1.0	ug/wipe	1	08/14/2013 17:10	73135
Aroclor-1221	ND		1.0	ug/wipe	1	08/14/2013 17:10	73135
Aroclor-1232	ND		1.0	ug/wipe	1	08/14/2013 17:10	73135
Aroclor-1242	ND		1.0	ug/wipe	1	08/14/2013 17:10	73135
Aroclor-1248	ND		1.0	ug/wipe	1	08/14/2013 17:10	73135
Aroclor-1254	ND		1.0	ug/wipe	1	08/14/2013 17:10	73135
Aroclor-1260	ND		1.0	ug/wipe	1	08/14/2013 17:10	73135
Surrogate: Tetrachloro-m-xylene	80.0		50-138	%REC	1	08/14/2013 17:10	73135
Surrogate: Decachlorobiphenyl	79.6		65-169	%REC	1	08/14/2013 17:10	73135

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-05
Lab ID: M1374-05
Project: CTO-X039, WIPES
Collection Date: 08/05/13 13:09

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1.0	ug/wipe	1	08/14/2013 17:28	73135
Aroclor-1221	ND		1.0	ug/wipe	1	08/14/2013 17:28	73135
Aroclor-1232	ND		1.0	ug/wipe	1	08/14/2013 17:28	73135
Aroclor-1242	ND		1.0	ug/wipe	1	08/14/2013 17:28	73135
Aroclor-1248	ND		1.0	ug/wipe	1	08/14/2013 17:28	73135
Aroclor-1254	ND		1.0	ug/wipe	1	08/14/2013 17:28	73135
Aroclor-1260	ND		1.0	ug/wipe	1	08/14/2013 17:28	73135
Surrogate: Tetrachloro-m-xylene	78.5		50-138	%REC	1	08/14/2013 17:28	73135
Surrogate: Decachlorobiphenyl	78.3		65-169	%REC	1	08/14/2013 17:28	73135

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-06
Lab ID: M1374-06
Project: CTO-X039, WIPES
Collection Date: 08/05/13 13:12

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1.0	ug/wipe	1	08/14/2013 17:47	73135
Aroclor-1221	ND		1.0	ug/wipe	1	08/14/2013 17:47	73135
Aroclor-1232	ND		1.0	ug/wipe	1	08/14/2013 17:47	73135
Aroclor-1242	ND		1.0	ug/wipe	1	08/14/2013 17:47	73135
Aroclor-1248	ND		1.0	ug/wipe	1	08/14/2013 17:47	73135
Aroclor-1254	ND		1.0	ug/wipe	1	08/14/2013 17:47	73135
Aroclor-1260	1.5		1.0	ug/wipe	1	08/14/2013 17:47	73135
Surrogate: Tetrachloro-m-xylene	79.0		50-138	%REC	1	08/14/2013 17:47	73135
Surrogate: Decachlorobiphenyl	78.0		65-169	%REC	1	08/14/2013 17:47	73135

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-07 **Project:** CTO-X039, WIPES
Lab ID: M1374-07 **Collection Date:** 08/05/13 13:15

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1.0	ug/wipe	1	08/14/2013 18:05	73135
Aroclor-1221	ND		1.0	ug/wipe	1	08/14/2013 18:05	73135
Aroclor-1232	ND		1.0	ug/wipe	1	08/14/2013 18:05	73135
Aroclor-1242	ND		1.0	ug/wipe	1	08/14/2013 18:05	73135
Aroclor-1248	ND		1.0	ug/wipe	1	08/14/2013 18:05	73135
Aroclor-1254	ND		1.0	ug/wipe	1	08/14/2013 18:05	73135
Aroclor-1260	ND		1.0	ug/wipe	1	08/14/2013 18:05	73135
Surrogate: Tetrachloro-m-xylene	78.9		50-138	%REC	1	08/14/2013 18:05	73135
Surrogate: Decachlorobiphenyl	78.1		65-169	%REC	1	08/14/2013 18:05	73135

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-08 **Project:** CTO-X039, WIPES
Lab ID: M1374-08 **Collection Date:** 08/05/13 13:18

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1.0	ug/wipe	1	08/14/2013 18:23	73135
Aroclor-1221	ND		1.0	ug/wipe	1	08/14/2013 18:23	73135
Aroclor-1232	ND		1.0	ug/wipe	1	08/14/2013 18:23	73135
Aroclor-1242	ND		1.0	ug/wipe	1	08/14/2013 18:23	73135
Aroclor-1248	ND		1.0	ug/wipe	1	08/14/2013 18:23	73135
Aroclor-1254	ND		1.0	ug/wipe	1	08/14/2013 18:23	73135
Aroclor-1260	ND		1.0	ug/wipe	1	08/14/2013 18:23	73135
Surrogate: Tetrachloro-m-xylene	84.8		50-138	%REC	1	08/14/2013 18:23	73135
Surrogate: Decachlorobiphenyl	81.0		65-169	%REC	1	08/14/2013 18:23	73135

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-09
Lab ID: M1374-09
Project: CTO-X039, WIPES
Collection Date: 08/05/13 13:21

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1.0	ug/wipe	1	08/14/2013 18:41	73135
Aroclor-1221	ND		1.0	ug/wipe	1	08/14/2013 18:41	73135
Aroclor-1232	ND		1.0	ug/wipe	1	08/14/2013 18:41	73135
Aroclor-1242	ND		1.0	ug/wipe	1	08/14/2013 18:41	73135
Aroclor-1248	ND		1.0	ug/wipe	1	08/14/2013 18:41	73135
Aroclor-1254	ND		1.0	ug/wipe	1	08/14/2013 18:41	73135
Aroclor-1260	1.3		1.0	ug/wipe	1	08/14/2013 18:41	73135
Surrogate: Tetrachloro-m-xylene	80.1		50-138	%REC	1	08/14/2013 18:41	73135
Surrogate: Decachlorobiphenyl	77.3		65-169	%REC	1	08/14/2013 18:41	73135

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-10
Lab ID: M1374-10
Project: CTO-X039, WIPES
Collection Date: 08/05/13 13:26

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1.0	ug/wipe	1	08/14/2013 19:35	73135
Aroclor-1221	ND		1.0	ug/wipe	1	08/14/2013 19:35	73135
Aroclor-1232	ND		1.0	ug/wipe	1	08/14/2013 19:35	73135
Aroclor-1242	ND		1.0	ug/wipe	1	08/14/2013 19:35	73135
Aroclor-1248	ND		1.0	ug/wipe	1	08/14/2013 19:35	73135
Aroclor-1254	ND		1.0	ug/wipe	1	08/14/2013 19:35	73135
Aroclor-1260	ND		1.0	ug/wipe	1	08/14/2013 19:35	73135
Surrogate: Tetrachloro-m-xylene	77.8		50-138	%REC	1	08/14/2013 19:35	73135
Surrogate: Decachlorobiphenyl	77.4		65-169	%REC	1	08/14/2013 19:35	73135

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client:	Tetra Tech, Inc.		
Client Sample ID:	SHHTR-WP-DUP01	**Project:**	CTO-X039, WIPES
Lab ID:	M1374-11	**Collection Date:**	08/05/13 0:00

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1.0	ug/wipe	1	08/14/2013 21:23	73135
Aroclor-1221	ND		1.0	ug/wipe	1	08/14/2013 21:23	73135
Aroclor-1232	ND		1.0	ug/wipe	1	08/14/2013 21:23	73135
Aroclor-1242	ND		1.0	ug/wipe	1	08/14/2013 21:23	73135
Aroclor-1248	ND		1.0	ug/wipe	1	08/14/2013 21:23	73135
Aroclor-1254	ND		1.0	ug/wipe	1	08/14/2013 21:23	73135
Aroclor-1260	ND		1.0	ug/wipe	1	08/14/2013 21:23	73135
Surrogate: Tetrachloro-m-xylene	76.3		50-138	%REC	1	08/14/2013 21:23	73135
Surrogate: Decachlorobiphenyl	76.8		65-169	%REC	1	08/14/2013 21:23	73135

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-11
Lab ID: M1374-12
Project: CTO-X039, WIPES
Collection Date: 08/07/13 8:10

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1000	ug/wipe	1000	08/15/2013 17:16	73135
Aroclor-1221	ND		1000	ug/wipe	1000	08/15/2013 17:16	73135
Aroclor-1232	ND		1000	ug/wipe	1000	08/15/2013 17:16	73135
Aroclor-1242	ND		1000	ug/wipe	1000	08/15/2013 17:16	73135
Aroclor-1248	ND		1000	ug/wipe	1000	08/15/2013 17:16	73135
Aroclor-1254	ND		1000	ug/wipe	1000	08/15/2013 17:16	73135
Aroclor-1260	7700		1000	ug/wipe	1000	08/15/2013 17:16	73135
Surrogate: Tetrachloro-m-xylene	0	S	50-138	%REC	1000	08/15/2013 17:16	73135
Surrogate: Decachlorobiphenyl	0	S	65-169	%REC	1000	08/15/2013 17:16	73135

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client:	Tetra Tech, Inc.		
Client Sample ID:	SHHTR-WP-12	**Project:**	CTO-X039, WIPES
Lab ID:	M1374-13	**Collection Date:**	08/07/13 8:13

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1000	ug/wipe	1000	08/15/2013 17:34	73135
Aroclor-1221	ND		1000	ug/wipe	1000	08/15/2013 17:34	73135
Aroclor-1232	ND		1000	ug/wipe	1000	08/15/2013 17:34	73135
Aroclor-1242	ND		1000	ug/wipe	1000	08/15/2013 17:34	73135
Aroclor-1248	ND		1000	ug/wipe	1000	08/15/2013 17:34	73135
Aroclor-1254	ND		1000	ug/wipe	1000	08/15/2013 17:34	73135
Aroclor-1260	6600		1000	ug/wipe	1000	08/15/2013 17:34	73135
Surrogate: Tetrachloro-m-xylene	0	S	50-138	%REC	1000	08/15/2013 17:34	73135
Surrogate: Decachlorobiphenyl	0	S	65-169	%REC	1000	08/15/2013 17:34	73135

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quanititation limits

B - Analyte detected in the associated Method Blank

DF - Dilution Factor

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-DUP02 **Project:** CTO-X039, WIPES
Lab ID: M1374-14 **Collection Date:** 08/07/13 0:00

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1000	ug/wipe	1000	08/15/2013 17:52	73135
Aroclor-1221	ND		1000	ug/wipe	1000	08/15/2013 17:52	73135
Aroclor-1232	ND		1000	ug/wipe	1000	08/15/2013 17:52	73135
Aroclor-1242	ND		1000	ug/wipe	1000	08/15/2013 17:52	73135
Aroclor-1248	ND		1000	ug/wipe	1000	08/15/2013 17:52	73135
Aroclor-1254	ND		1000	ug/wipe	1000	08/15/2013 17:52	73135
Aroclor-1260	6400		1000	ug/wipe	1000	08/15/2013 17:52	73135
Surrogate: Tetrachloro-m-xylene	0	S	50-138	%REC	1000	08/15/2013 17:52	73135
Surrogate: Decachlorobiphenyl	0	S	65-169	%REC	1000	08/15/2013 17:52	73135

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-13 **Project:** CTO-X039, WIPES
Lab ID: M1374-15 **Collection Date:** 08/07/13 8:16

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1000	ug/wipe	1000	08/15/2013 15:28	73135
Aroclor-1221	ND		1000	ug/wipe	1000	08/15/2013 15:28	73135
Aroclor-1232	ND		1000	ug/wipe	1000	08/15/2013 15:28	73135
Aroclor-1242	ND		1000	ug/wipe	1000	08/15/2013 15:28	73135
Aroclor-1248	ND		1000	ug/wipe	1000	08/15/2013 15:28	73135
Aroclor-1254	ND		1000	ug/wipe	1000	08/15/2013 15:28	73135
Aroclor-1260	1800		1000	ug/wipe	1000	08/15/2013 15:28	73135
Surrogate: Tetrachloro-m-xylene	0	S	50-138	%REC	1000	08/15/2013 15:28	73135
Surrogate: Decachlorobiphenyl	0	S	65-169	%REC	1000	08/15/2013 15:28	73135

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-14
Lab ID: M1374-16
Project: CTO-X039, WIPES
Collection Date: 08/07/13 8:18

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1000	ug/wipe	1000	08/15/2013 15:46	73135
Aroclor-1221	ND		1000	ug/wipe	1000	08/15/2013 15:46	73135
Aroclor-1232	ND		1000	ug/wipe	1000	08/15/2013 15:46	73135
Aroclor-1242	ND		1000	ug/wipe	1000	08/15/2013 15:46	73135
Aroclor-1248	ND		1000	ug/wipe	1000	08/15/2013 15:46	73135
Aroclor-1254	ND		1000	ug/wipe	1000	08/15/2013 15:46	73135
Aroclor-1260	11000		1000	ug/wipe	1000	08/15/2013 15:46	73135
Surrogate: Tetrachloro-m-xylene	0	S	50-138	%REC	1000	08/15/2013 15:46	73135
Surrogate: Decachlorobiphenyl	0	S	65-169	%REC	1000	08/15/2013 15:46	73135

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-15 **Project:** CTO-X039, WIPES
Lab ID: M1374-17 **Collection Date:** 08/07/13 8:21

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1000	ug/wipe	1000	08/15/2013 16:04	73135
Aroclor-1221	ND		1000	ug/wipe	1000	08/15/2013 16:04	73135
Aroclor-1232	ND		1000	ug/wipe	1000	08/15/2013 16:04	73135
Aroclor-1242	ND		1000	ug/wipe	1000	08/15/2013 16:04	73135
Aroclor-1248	ND		1000	ug/wipe	1000	08/15/2013 16:04	73135
Aroclor-1254	ND		1000	ug/wipe	1000	08/15/2013 16:04	73135
Aroclor-1260	2000		1000	ug/wipe	1000	08/15/2013 16:04	73135
Surrogate: Tetrachloro-m-xylene	0	S	50-138	%REC	1000	08/15/2013 16:04	73135
Surrogate: Decachlorobiphenyl	0	S	65-169	%REC	1000	08/15/2013 16:04	73135

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-16
Lab ID: M1374-18
Project: CTO-X039, WIPES
Collection Date: 08/07/13 8:24

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1000	ug/wipe	1000	08/15/2013 16:58	73135
Aroclor-1221	ND		1000	ug/wipe	1000	08/15/2013 16:58	73135
Aroclor-1232	ND		1000	ug/wipe	1000	08/15/2013 16:58	73135
Aroclor-1242	ND		1000	ug/wipe	1000	08/15/2013 16:58	73135
Aroclor-1248	ND		1000	ug/wipe	1000	08/15/2013 16:58	73135
Aroclor-1254	ND		1000	ug/wipe	1000	08/15/2013 16:58	73135
Aroclor-1260	2900		1000	ug/wipe	1000	08/15/2013 16:58	73135
Surrogate: Tetrachloro-m-xylene	0	S	50-138	%REC	1000	08/15/2013 16:58	73135
Surrogate: Decachlorobiphenyl	0	S	65-169	%REC	1000	08/15/2013 16:58	73135

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-17 **Project:** CTO-X039, WIPES
Lab ID: M1374-19 **Collection Date:** 08/07/13 8:27

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1.0	ug/wipe	1	08/15/2013 0:24	73135
Aroclor-1221	ND		1.0	ug/wipe	1	08/15/2013 0:24	73135
Aroclor-1232	ND		1.0	ug/wipe	1	08/15/2013 0:24	73135
Aroclor-1242	ND		1.0	ug/wipe	1	08/15/2013 0:24	73135
Aroclor-1248	ND		1.0	ug/wipe	1	08/15/2013 0:24	73135
Aroclor-1254	ND		1.0	ug/wipe	1	08/15/2013 0:24	73135
Aroclor-1260	3.0		1.0	ug/wipe	1	08/15/2013 0:24	73135
Surrogate: Tetrachloro-m-xylene	76.4		50-138	%REC	1	08/15/2013 0:24	73135
Surrogate: Decachlorobiphenyl	76.6		65-169	%REC	1	08/15/2013 0:24	73135

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-18
Project: CTO-X039, WIPES
Lab ID: M1374-20
Collection Date: 08/07/13 8:30

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1.0	ug/wipe	1	08/15/2013 0:42	73135
Aroclor-1221	ND		1.0	ug/wipe	1	08/15/2013 0:42	73135
Aroclor-1232	ND		1.0	ug/wipe	1	08/15/2013 0:42	73135
Aroclor-1242	ND		1.0	ug/wipe	1	08/15/2013 0:42	73135
Aroclor-1248	ND		1.0	ug/wipe	1	08/15/2013 0:42	73135
Aroclor-1254	ND		1.0	ug/wipe	1	08/15/2013 0:42	73135
Aroclor-1260	2.7		1.0	ug/wipe	1	08/15/2013 0:42	73135
Surrogate: Tetrachloro-m-xylene	75.0		50-138	%REC	1	08/15/2013 0:42	73135
Surrogate: Decachlorobiphenyl	74.3		65-169	%REC	1	08/15/2013 0:42	73135

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-19 **Project:** CTO-X039, WIPES
Lab ID: M1374-21 **Collection Date:** 08/07/13 8:33

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1.0	ug/wipe	1	08/21/2013 5:08	73167
Aroclor-1221	ND		1.0	ug/wipe	1	08/21/2013 5:08	73167
Aroclor-1232	ND		1.0	ug/wipe	1	08/21/2013 5:08	73167
Aroclor-1242	ND		1.0	ug/wipe	1	08/21/2013 5:08	73167
Aroclor-1248	ND		1.0	ug/wipe	1	08/21/2013 5:08	73167
Aroclor-1254	ND		1.0	ug/wipe	1	08/21/2013 5:08	73167
Aroclor-1260	1.3		1.0	ug/wipe	1	08/21/2013 5:08	73167
Surrogate: Tetrachloro-m-xylene	85.9		50-138	%REC	1	08/21/2013 5:08	73167
Surrogate: Decachlorobiphenyl	80.8		65-169	%REC	1	08/21/2013 5:08	73167

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-20
Lab ID: M1374-22
Project: CTO-X039, WIPES
Collection Date: 08/07/13 8:35

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1.0	ug/wipe	1	08/21/2013 5:26	73167
Aroclor-1221	ND		1.0	ug/wipe	1	08/21/2013 5:26	73167
Aroclor-1232	ND		1.0	ug/wipe	1	08/21/2013 5:26	73167
Aroclor-1242	ND		1.0	ug/wipe	1	08/21/2013 5:26	73167
Aroclor-1248	ND		1.0	ug/wipe	1	08/21/2013 5:26	73167
Aroclor-1254	ND		1.0	ug/wipe	1	08/21/2013 5:26	73167
Aroclor-1260	ND		1.0	ug/wipe	1	08/21/2013 5:26	73167
Surrogate: Tetrachloro-m-xylene	92.9		50-138	%REC	1	08/21/2013 5:26	73167
Surrogate: Decachlorobiphenyl	86.5		65-169	%REC	1	08/21/2013 5:26	73167

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-21 **Project:** CTO-X039, WIPES
Lab ID: M1374-23 **Collection Date:** 08/07/13 8:37

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1.0	ug/wipe	1	08/21/2013 5:44	73167
Aroclor-1221	ND		1.0	ug/wipe	1	08/21/2013 5:44	73167
Aroclor-1232	ND		1.0	ug/wipe	1	08/21/2013 5:44	73167
Aroclor-1242	ND		1.0	ug/wipe	1	08/21/2013 5:44	73167
Aroclor-1248	ND		1.0	ug/wipe	1	08/21/2013 5:44	73167
Aroclor-1254	ND		1.0	ug/wipe	1	08/21/2013 5:44	73167
Aroclor-1260	1.1		1.0	ug/wipe	1	08/21/2013 5:44	73167
Surrogate: Tetrachloro-m-xylene	3.89	S	50-138	%REC	1	08/21/2013 5:44	73167
Surrogate: Decachlorobiphenyl	67.8		65-169	%REC	1	08/21/2013 5:44	73167

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-22
Lab ID: M1374-24
Project: CTO-X039, WIPES
Collection Date: 08/07/13 8:40

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1.0	ug/wipe	1	08/21/2013 6:02	73167
Aroclor-1221	ND		1.0	ug/wipe	1	08/21/2013 6:02	73167
Aroclor-1232	ND		1.0	ug/wipe	1	08/21/2013 6:02	73167
Aroclor-1242	ND		1.0	ug/wipe	1	08/21/2013 6:02	73167
Aroclor-1248	ND		1.0	ug/wipe	1	08/21/2013 6:02	73167
Aroclor-1254	ND		1.0	ug/wipe	1	08/21/2013 6:02	73167
Aroclor-1260	ND		1.0	ug/wipe	1	08/21/2013 6:02	73167
Surrogate: Tetrachloro-m-xylene	89.0		50-138	%REC	1	08/21/2013 6:02	73167
Surrogate: Decachlorobiphenyl	82.8		65-169	%REC	1	08/21/2013 6:02	73167

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

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08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-23
Lab ID: M1374-25
Project: CTO-X039, WIPES
Collection Date: 08/07/13 8:43

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1.0	ug/wipe	1	08/21/2013 6:20	73167
Aroclor-1221	ND		1.0	ug/wipe	1	08/21/2013 6:20	73167
Aroclor-1232	ND		1.0	ug/wipe	1	08/21/2013 6:20	73167
Aroclor-1242	ND		1.0	ug/wipe	1	08/21/2013 6:20	73167
Aroclor-1248	ND		1.0	ug/wipe	1	08/21/2013 6:20	73167
Aroclor-1254	ND		1.0	ug/wipe	1	08/21/2013 6:20	73167
Aroclor-1260	5.0		1.0	ug/wipe	1	08/21/2013 6:20	73167
Surrogate: Tetrachloro-m-xylene	83.3		50-138	%REC	1	08/21/2013 6:20	73167
Surrogate: Decachlorobiphenyl	79.9		65-169	%REC	1	08/21/2013 6:20	73167

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-24
Lab ID: M1374-26
Project: CTO-X039, WIPES
Collection Date: 08/07/13 8:46

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1.0	ug/wipe	1	08/21/2013 6:38	73167
Aroclor-1221	ND		1.0	ug/wipe	1	08/21/2013 6:38	73167
Aroclor-1232	ND		1.0	ug/wipe	1	08/21/2013 6:38	73167
Aroclor-1242	ND		1.0	ug/wipe	1	08/21/2013 6:38	73167
Aroclor-1248	ND		1.0	ug/wipe	1	08/21/2013 6:38	73167
Aroclor-1254	ND		1.0	ug/wipe	1	08/21/2013 6:38	73167
Aroclor-1260	ND		1.0	ug/wipe	1	08/21/2013 6:38	73167
Surrogate: Tetrachloro-m-xylene	81.8		50-138	%REC	1	08/21/2013 6:38	73167
Surrogate: Decachlorobiphenyl	77.1		65-169	%REC	1	08/21/2013 6:38	73167

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-DUP03
Lab ID: M1374-27
Project: CTO-X039, WIPES
Collection Date: 08/07/13 0:00

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1.0	ug/wipe	1	08/21/2013 6:56	73167
Aroclor-1221	ND		1.0	ug/wipe	1	08/21/2013 6:56	73167
Aroclor-1232	ND		1.0	ug/wipe	1	08/21/2013 6:56	73167
Aroclor-1242	ND		1.0	ug/wipe	1	08/21/2013 6:56	73167
Aroclor-1248	ND		1.0	ug/wipe	1	08/21/2013 6:56	73167
Aroclor-1254	ND		1.0	ug/wipe	1	08/21/2013 6:56	73167
Aroclor-1260	5.4		1.0	ug/wipe	1	08/21/2013 6:56	73167
Surrogate: Tetrachloro-m-xylene	81.1		50-138	%REC	1	08/21/2013 6:56	73167
Surrogate: Decachlorobiphenyl	77.7		65-169	%REC	1	08/21/2013 6:56	73167

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-25
Lab ID: M1374-28
Project: CTO-X039, WIPES
Collection Date: 08/07/13 8:50

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1.0	ug/wipe	1	08/21/2013 7:14	73167
Aroclor-1221	ND		1.0	ug/wipe	1	08/21/2013 7:14	73167
Aroclor-1232	ND		1.0	ug/wipe	1	08/21/2013 7:14	73167
Aroclor-1242	ND		1.0	ug/wipe	1	08/21/2013 7:14	73167
Aroclor-1248	ND		1.0	ug/wipe	1	08/21/2013 7:14	73167
Aroclor-1254	ND		1.0	ug/wipe	1	08/21/2013 7:14	73167
Aroclor-1260	2.1		1.0	ug/wipe	1	08/21/2013 7:14	73167
Surrogate: Tetrachloro-m-xylene	82.1		50-138	%REC	1	08/21/2013 7:14	73167
Surrogate: Decachlorobiphenyl	77.9		65-169	%REC	1	08/21/2013 7:14	73167

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-26 **Project:** CTO-X039, WIPES
Lab ID: M1374-29 **Collection Date:** 08/07/13 8:53

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1.0	ug/wipe	1	08/21/2013 7:32	73167
Aroclor-1221	ND		1.0	ug/wipe	1	08/21/2013 7:32	73167
Aroclor-1232	ND		1.0	ug/wipe	1	08/21/2013 7:32	73167
Aroclor-1242	ND		1.0	ug/wipe	1	08/21/2013 7:32	73167
Aroclor-1248	ND		1.0	ug/wipe	1	08/21/2013 7:32	73167
Aroclor-1254	ND		1.0	ug/wipe	1	08/21/2013 7:32	73167
Aroclor-1260	2.1		1.0	ug/wipe	1	08/21/2013 7:32	73167
Surrogate: Tetrachloro-m-xylene	84.1		50-138	%REC	1	08/21/2013 7:32	73167
Surrogate: Decachlorobiphenyl	79.0		65-169	%REC	1	08/21/2013 7:32	73167

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-27
Lab ID: M1374-30
Project: CTO-X039, WIPES
Collection Date: 08/07/13 8:57

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		10	ug/wipe	10	08/22/2013 16:23	73167
Aroclor-1221	ND		10	ug/wipe	10	08/22/2013 16:23	73167
Aroclor-1232	ND		10	ug/wipe	10	08/22/2013 16:23	73167
Aroclor-1242	ND		10	ug/wipe	10	08/22/2013 16:23	73167
Aroclor-1248	ND		10	ug/wipe	10	08/22/2013 16:23	73167
Aroclor-1254	ND		10	ug/wipe	10	08/22/2013 16:23	73167
Aroclor-1260	26		10	ug/wipe	10	08/22/2013 16:23	73167
Surrogate: Tetrachloro-m-xylene	101		50-138	%REC	10	08/22/2013 16:23	73167
Surrogate: Decachlorobiphenyl	99.7		65-169	%REC	10	08/22/2013 16:23	73167

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-28
Lab ID: M1374-31
Project: CTO-X039, WIPES
Collection Date: 08/07/13 8:59

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		2.0	ug/wipe	2	08/22/2013 16:41	73167
Aroclor-1221	ND		2.0	ug/wipe	2	08/22/2013 16:41	73167
Aroclor-1232	ND		2.0	ug/wipe	2	08/22/2013 16:41	73167
Aroclor-1242	ND		2.0	ug/wipe	2	08/22/2013 16:41	73167
Aroclor-1248	ND		2.0	ug/wipe	2	08/22/2013 16:41	73167
Aroclor-1254	ND		2.0	ug/wipe	2	08/22/2013 16:41	73167
Aroclor-1260	12		2.0	ug/wipe	2	08/22/2013 16:41	73167
Surrogate: Tetrachloro-m-xylene	84.9		50-138	%REC	2	08/22/2013 16:41	73167
Surrogate: Decachlorobiphenyl	81.9		65-169	%REC	2	08/22/2013 16:41	73167

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-29
Lab ID: M1374-32
Project: CTO-X039, WIPES
Collection Date: 08/07/13 9:01

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		10	ug/wipe	10	08/22/2013 16:59	73167
Aroclor-1221	ND		10	ug/wipe	10	08/22/2013 16:59	73167
Aroclor-1232	ND		10	ug/wipe	10	08/22/2013 16:59	73167
Aroclor-1242	ND		10	ug/wipe	10	08/22/2013 16:59	73167
Aroclor-1248	ND		10	ug/wipe	10	08/22/2013 16:59	73167
Aroclor-1254	ND		10	ug/wipe	10	08/22/2013 16:59	73167
Aroclor-1260	41		10	ug/wipe	10	08/22/2013 16:59	73167
Surrogate: Tetrachloro-m-xylene	109		50-138	%REC	10	08/22/2013 16:59	73167
Surrogate: Decachlorobiphenyl	114		65-169	%REC	10	08/22/2013 16:59	73167

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client:	Tetra Tech, Inc.		
Client Sample ID:	SHHTR-WP-30	**Project:**	CTO-X039, WIPES
Lab ID:	M1374-33	**Collection Date:**	08/07/13 9:03

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		10	ug/wipe	10	08/22/2013 17:17	73167
Aroclor-1221	ND		10	ug/wipe	10	08/22/2013 17:17	73167
Aroclor-1232	ND		10	ug/wipe	10	08/22/2013 17:17	73167
Aroclor-1242	ND		10	ug/wipe	10	08/22/2013 17:17	73167
Aroclor-1248	ND		10	ug/wipe	10	08/22/2013 17:17	73167
Aroclor-1254	ND		10	ug/wipe	10	08/22/2013 17:17	73167
Aroclor-1260	42		10	ug/wipe	10	08/22/2013 17:17	73167
Surrogate: Tetrachloro-m-xylene	103		50-138	%REC	10	08/22/2013 17:17	73167
Surrogate: Decachlorobiphenyl	109		65-169	%REC	10	08/22/2013 17:17	73167

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quanititation limits

B - Analyte detected in the associated Method Blank

DF - Dilution Factor

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

RL - Reporting Limit

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-31 **Project:** CTO-X039, WIPES
Lab ID: M1374-34 **Collection Date:** 08/07/13 9:05

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		5.0	ug/wipe	5	08/22/2013 17:35	73167
Aroclor-1221	ND		5.0	ug/wipe	5	08/22/2013 17:35	73167
Aroclor-1232	ND		5.0	ug/wipe	5	08/22/2013 17:35	73167
Aroclor-1242	ND		5.0	ug/wipe	5	08/22/2013 17:35	73167
Aroclor-1248	ND		5.0	ug/wipe	5	08/22/2013 17:35	73167
Aroclor-1254	ND		5.0	ug/wipe	5	08/22/2013 17:35	73167
Aroclor-1260	18		5.0	ug/wipe	5	08/22/2013 17:35	73167
Surrogate: Tetrachloro-m-xylene	38.8	S	50-138	%REC	5	08/22/2013 17:35	73167
Surrogate: Decachlorobiphenyl	86.0		65-169	%REC	5	08/22/2013 17:35	73167

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-32
Lab ID: M1374-35

Project: CTO-X039, WIPES
Collection Date: 08/07/13 9:09

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		10	ug/wipe	10	08/22/2013 17:53	73167
Aroclor-1221	ND		10	ug/wipe	10	08/22/2013 17:53	73167
Aroclor-1232	ND		10	ug/wipe	10	08/22/2013 17:53	73167
Aroclor-1242	ND		10	ug/wipe	10	08/22/2013 17:53	73167
Aroclor-1248	ND		10	ug/wipe	10	08/22/2013 17:53	73167
Aroclor-1254	ND		10	ug/wipe	10	08/22/2013 17:53	73167
Aroclor-1260	51		10	ug/wipe	10	08/22/2013 17:53	73167
Surrogate: Tetrachloro-m-xylene	107		50-138	%REC	10	08/22/2013 17:53	73167
Surrogate: Decachlorobiphenyl	116		65-169	%REC	10	08/22/2013 17:53	73167

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-33
Lab ID: M1374-36
Project: CTO-X039, WIPES
Collection Date: 08/07/13 9:11

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1.0	ug/wipe	1	08/21/2013 11:45	73167
Aroclor-1221	ND		1.0	ug/wipe	1	08/21/2013 11:45	73167
Aroclor-1232	ND		1.0	ug/wipe	1	08/21/2013 11:45	73167
Aroclor-1242	ND		1.0	ug/wipe	1	08/21/2013 11:45	73167
Aroclor-1248	ND		1.0	ug/wipe	1	08/21/2013 11:45	73167
Aroclor-1254	ND		1.0	ug/wipe	1	08/21/2013 11:45	73167
Aroclor-1260	10		1.0	ug/wipe	1	08/21/2013 11:45	73167
Surrogate: Tetrachloro-m-xylene	82.2		50-138	%REC	1	08/21/2013 11:45	73167
Surrogate: Decachlorobiphenyl	77.3		65-169	%REC	1	08/21/2013 11:45	73167

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-34 **Project:** CTO-X039, WIPES
Lab ID: M1374-37 **Collection Date:** 08/07/13 9:13

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		10	ug/wipe	10	08/22/2013 18:11	73167
Aroclor-1221	ND		10	ug/wipe	10	08/22/2013 18:11	73167
Aroclor-1232	ND		10	ug/wipe	10	08/22/2013 18:11	73167
Aroclor-1242	ND		10	ug/wipe	10	08/22/2013 18:11	73167
Aroclor-1248	ND		10	ug/wipe	10	08/22/2013 18:11	73167
Aroclor-1254	ND		10	ug/wipe	10	08/22/2013 18:11	73167
Aroclor-1260	36		10	ug/wipe	10	08/22/2013 18:11	73167
Surrogate: Tetrachloro-m-xylene	104		50-138	%REC	10	08/22/2013 18:11	73167
Surrogate: Decachlorobiphenyl	107		65-169	%REC	10	08/22/2013 18:11	73167

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-35
Lab ID: M1374-38
Project: CTO-X039, WIPES
Collection Date: 08/07/13 9:15

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1.0	ug/wipe	1	08/21/2013 12:22	73167
Aroclor-1221	ND		1.0	ug/wipe	1	08/21/2013 12:22	73167
Aroclor-1232	ND		1.0	ug/wipe	1	08/21/2013 12:22	73167
Aroclor-1242	ND		1.0	ug/wipe	1	08/21/2013 12:22	73167
Aroclor-1248	ND		1.0	ug/wipe	1	08/21/2013 12:22	73167
Aroclor-1254	ND		1.0	ug/wipe	1	08/21/2013 12:22	73167
Aroclor-1260	8.3		1.0	ug/wipe	1	08/21/2013 12:22	73167
Surrogate: Tetrachloro-m-xylene	88.0		50-138	%REC	1	08/21/2013 12:22	73167
Surrogate: Decachlorobiphenyl	81.6		65-169	%REC	1	08/21/2013 12:22	73167

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-DUP04
Lab ID: M1374-39
Project: CTO-X039, WIPES
Collection Date: 08/07/13 0:00

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		5.0	ug/wipe	5	08/22/2013 18:30	73167
Aroclor-1221	ND		5.0	ug/wipe	5	08/22/2013 18:30	73167
Aroclor-1232	ND		5.0	ug/wipe	5	08/22/2013 18:30	73167
Aroclor-1242	ND		5.0	ug/wipe	5	08/22/2013 18:30	73167
Aroclor-1248	ND		5.0	ug/wipe	5	08/22/2013 18:30	73167
Aroclor-1254	ND		5.0	ug/wipe	5	08/22/2013 18:30	73167
Aroclor-1260	18		5.0	ug/wipe	5	08/22/2013 18:30	73167
Surrogate: Tetrachloro-m-xylene	91.7		50-138	%REC	5	08/22/2013 18:30	73167
Surrogate: Decachlorobiphenyl	90.4		65-169	%REC	5	08/22/2013 18:30	73167

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-36
Lab ID: M1374-40
Project: CTO-X039, WIPES
Collection Date: 08/07/13 9:18

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		20	ug/wipe	20	08/22/2013 18:48	73167
Aroclor-1221	ND		20	ug/wipe	20	08/22/2013 18:48	73167
Aroclor-1232	ND		20	ug/wipe	20	08/22/2013 18:48	73167
Aroclor-1242	ND		20	ug/wipe	20	08/22/2013 18:48	73167
Aroclor-1248	ND		20	ug/wipe	20	08/22/2013 18:48	73167
Aroclor-1254	ND		20	ug/wipe	20	08/22/2013 18:48	73167
Aroclor-1260	79		20	ug/wipe	20	08/22/2013 18:48	73167
Surrogate: Tetrachloro-m-xylene	97.5		50-138	%REC	20	08/22/2013 18:48	73167
Surrogate: Decachlorobiphenyl	112		65-169	%REC	20	08/22/2013 18:48	73167

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-37
Lab ID: M1374-41
Project: CTO-X039, WIPES
Collection Date: 08/07/13 9:21

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		2.0	ug/wipe	2	08/22/2013 19:06	73188
Aroclor-1221	ND		2.0	ug/wipe	2	08/22/2013 19:06	73188
Aroclor-1232	ND		2.0	ug/wipe	2	08/22/2013 19:06	73188
Aroclor-1242	ND		2.0	ug/wipe	2	08/22/2013 19:06	73188
Aroclor-1248	ND		2.0	ug/wipe	2	08/22/2013 19:06	73188
Aroclor-1254	ND		2.0	ug/wipe	2	08/22/2013 19:06	73188
Aroclor-1260	15		2.0	ug/wipe	2	08/22/2013 19:06	73188
Surrogate: Tetrachloro-m-xylene	93.2		50-138	%REC	2	08/22/2013 19:06	73188
Surrogate: Decachlorobiphenyl	88.1		65-169	%REC	2	08/22/2013 19:06	73188

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-38 **Project:** CTO-X039, WIPES
Lab ID: M1374-42 **Collection Date:** 08/07/13 9:23

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		20	ug/wipe	20	08/22/2013 19:24	73188
Aroclor-1221	ND		20	ug/wipe	20	08/22/2013 19:24	73188
Aroclor-1232	ND		20	ug/wipe	20	08/22/2013 19:24	73188
Aroclor-1242	ND		20	ug/wipe	20	08/22/2013 19:24	73188
Aroclor-1248	ND		20	ug/wipe	20	08/22/2013 19:24	73188
Aroclor-1254	ND		20	ug/wipe	20	08/22/2013 19:24	73188
Aroclor-1260	66		20	ug/wipe	20	08/22/2013 19:24	73188
Surrogate: Tetrachloro-m-xylene	110		50-138	%REC	20	08/22/2013 19:24	73188
Surrogate: Decachlorobiphenyl	125		65-169	%REC	20	08/22/2013 19:24	73188

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-FB02
Lab ID: M1374-43
Project: CTO-X039, WIPES
Collection Date: 08/07/13 14:50

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1.0	ug/wipe	1	08/21/2013 18:08	73188
Aroclor-1221	ND		1.0	ug/wipe	1	08/21/2013 18:08	73188
Aroclor-1232	ND		1.0	ug/wipe	1	08/21/2013 18:08	73188
Aroclor-1242	ND		1.0	ug/wipe	1	08/21/2013 18:08	73188
Aroclor-1248	ND		1.0	ug/wipe	1	08/21/2013 18:08	73188
Aroclor-1254	ND		1.0	ug/wipe	1	08/21/2013 18:08	73188
Aroclor-1260	3.6		1.0	ug/wipe	1	08/21/2013 18:08	73188
Surrogate: Tetrachloro-m-xylene	88.8		50-138	%REC	1	08/21/2013 18:08	73188
Surrogate: Decachlorobiphenyl	82.9		65-169	%REC	1	08/21/2013 18:08	73188

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/26/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-WP-FB01
Lab ID: M1374-44
Project: CTO-X039, WIPES
Collection Date: 08/06/13 10:45

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD (wipe)							**SW8082_WIPE**
Aroclor-1016	ND		1.0	ug/wipe	1	08/21/2013 18:27	73188
Aroclor-1221	ND		1.0	ug/wipe	1	08/21/2013 18:27	73188
Aroclor-1232	ND		1.0	ug/wipe	1	08/21/2013 18:27	73188
Aroclor-1242	ND		1.0	ug/wipe	1	08/21/2013 18:27	73188
Aroclor-1248	ND		1.0	ug/wipe	1	08/21/2013 18:27	73188
Aroclor-1254	ND		1.0	ug/wipe	1	08/21/2013 18:27	73188
Aroclor-1260	1.1		1.0	ug/wipe	1	08/21/2013 18:27	73188
Surrogate: Tetrachloro-m-xylene	88.5		50-138	%REC	1	08/21/2013 18:27	73188
Surrogate: Decachlorobiphenyl	84.3		65-169	%REC	1	08/21/2013 18:27	73188

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-01
Lab ID: M1375-05
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/05/13 14:30

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		34000	ug/Kg	1000	08/23/2013 19:26	73132
Aroclor-1221	ND		34000	ug/Kg	1000	08/23/2013 19:26	73132
Aroclor-1232	ND		34000	ug/Kg	1000	08/23/2013 19:26	73132
Aroclor-1242	ND		34000	ug/Kg	1000	08/23/2013 19:26	73132
Aroclor-1248	ND		34000	ug/Kg	1000	08/23/2013 19:26	73132
Aroclor-1254	ND		34000	ug/Kg	1000	08/23/2013 19:26	73132
Aroclor-1260	440000		34000	ug/Kg	1000	08/23/2013 19:26	73132
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	1000	08/23/2013 19:26	73132
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	1000	08/23/2013 19:26	73132

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-02
Lab ID: M1375-06
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/05/13 14:40

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		1700000	ug/Kg	50000	08/26/2013 17:57	73132
Aroclor-1221	ND		1700000	ug/Kg	50000	08/26/2013 17:57	73132
Aroclor-1232	ND		1700000	ug/Kg	50000	08/26/2013 17:57	73132
Aroclor-1242	ND		1700000	ug/Kg	50000	08/26/2013 17:57	73132
Aroclor-1248	ND		1700000	ug/Kg	50000	08/26/2013 17:57	73132
Aroclor-1254	ND		1700000	ug/Kg	50000	08/26/2013 17:57	73132
Aroclor-1260	16000000		1700000	ug/Kg	50000	08/26/2013 17:57	73132
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	50000	08/26/2013 17:57	73132
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	50000	08/26/2013 17:57	73132

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-03
Lab ID: M1375-07
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/05/13 14:48

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		370000	ug/Kg	10000	08/26/2013 18:15	73132
Aroclor-1221	ND		370000	ug/Kg	10000	08/26/2013 18:15	73132
Aroclor-1232	ND		370000	ug/Kg	10000	08/26/2013 18:15	73132
Aroclor-1242	ND		370000	ug/Kg	10000	08/26/2013 18:15	73132
Aroclor-1248	ND		370000	ug/Kg	10000	08/26/2013 18:15	73132
Aroclor-1254	ND		370000	ug/Kg	10000	08/26/2013 18:15	73132
Aroclor-1260	1400000		370000	ug/Kg	10000	08/26/2013 18:15	73132
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	10000	08/26/2013 18:15	73132
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	10000	08/26/2013 18:15	73132

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

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08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-04
Lab ID: M1375-08
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/05/13 15:00

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		940000	ug/Kg	20000	08/26/2013 18:34	73132
Aroclor-1221	ND		940000	ug/Kg	20000	08/26/2013 18:34	73132
Aroclor-1232	ND		940000	ug/Kg	20000	08/26/2013 18:34	73132
Aroclor-1242	ND		940000	ug/Kg	20000	08/26/2013 18:34	73132
Aroclor-1248	ND		940000	ug/Kg	20000	08/26/2013 18:34	73132
Aroclor-1254	ND		940000	ug/Kg	20000	08/26/2013 18:34	73132
Aroclor-1260	4100000		940000	ug/Kg	20000	08/26/2013 18:34	73132
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	20000	08/26/2013 18:34	73132
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	20000	08/26/2013 18:34	73132

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

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08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-05
Lab ID: M1375-09
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/05/13 15:07

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		430000	ug/Kg	10000	08/26/2013 18:52	73132
Aroclor-1221	ND		430000	ug/Kg	10000	08/26/2013 18:52	73132
Aroclor-1232	ND		430000	ug/Kg	10000	08/26/2013 18:52	73132
Aroclor-1242	ND		430000	ug/Kg	10000	08/26/2013 18:52	73132
Aroclor-1248	ND		430000	ug/Kg	10000	08/26/2013 18:52	73132
Aroclor-1254	ND		430000	ug/Kg	10000	08/26/2013 18:52	73132
Aroclor-1260	2100000		430000	ug/Kg	10000	08/26/2013 18:52	73132
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	10000	08/26/2013 18:52	73132
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	10000	08/26/2013 18:52	73132

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

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08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-06
Lab ID: M1375-10
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/05/13 15:14

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		46000	ug/Kg	1000	08/23/2013 20:56	73132
Aroclor-1221	ND		46000	ug/Kg	1000	08/23/2013 20:56	73132
Aroclor-1232	ND		46000	ug/Kg	1000	08/23/2013 20:56	73132
Aroclor-1242	ND		46000	ug/Kg	1000	08/23/2013 20:56	73132
Aroclor-1248	ND		46000	ug/Kg	1000	08/23/2013 20:56	73132
Aroclor-1254	ND		46000	ug/Kg	1000	08/23/2013 20:56	73132
Aroclor-1260	370000		46000	ug/Kg	1000	08/23/2013 20:56	73132
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	1000	08/23/2013 20:56	73132
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	1000	08/23/2013 20:56	73132

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

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08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-DUP01
Lab ID: M1375-11
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/05/13 0:00

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		170000	ug/Kg	5000	08/26/2013 19:10	73132
Aroclor-1221	ND		170000	ug/Kg	5000	08/26/2013 19:10	73132
Aroclor-1232	ND		170000	ug/Kg	5000	08/26/2013 19:10	73132
Aroclor-1242	ND		170000	ug/Kg	5000	08/26/2013 19:10	73132
Aroclor-1248	ND		170000	ug/Kg	5000	08/26/2013 19:10	73132
Aroclor-1254	ND		170000	ug/Kg	5000	08/26/2013 19:10	73132
Aroclor-1260	670000		170000	ug/Kg	5000	08/26/2013 19:10	73132
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	5000	08/26/2013 19:10	73132
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	5000	08/26/2013 19:10	73132

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-07
Lab ID: M1375-12
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/05/13 15:25

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		33000	ug/Kg	1000	08/23/2013 23:03	73132
Aroclor-1221	ND		33000	ug/Kg	1000	08/23/2013 23:03	73132
Aroclor-1232	ND		33000	ug/Kg	1000	08/23/2013 23:03	73132
Aroclor-1242	ND		33000	ug/Kg	1000	08/23/2013 23:03	73132
Aroclor-1248	ND		33000	ug/Kg	1000	08/23/2013 23:03	73132
Aroclor-1254	ND		33000	ug/Kg	1000	08/23/2013 23:03	73132
Aroclor-1260	18000	J	33000	ug/Kg	1000	08/23/2013 23:03	73132
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	1000	08/23/2013 23:03	73132
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	1000	08/23/2013 23:03	73132

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-08 **Project:** CTO-X039, Caulk, Concrete
Lab ID: M1375-13 **Collection Date:** 08/05/13 15:33

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		6600	ug/Kg	200	08/26/2013 19:28	73132
Aroclor-1221	ND		6600	ug/Kg	200	08/26/2013 19:28	73132
Aroclor-1232	ND		6600	ug/Kg	200	08/26/2013 19:28	73132
Aroclor-1242	ND		6600	ug/Kg	200	08/26/2013 19:28	73132
Aroclor-1248	ND		6600	ug/Kg	200	08/26/2013 19:28	73132
Aroclor-1254	ND		6600	ug/Kg	200	08/26/2013 19:28	73132
Aroclor-1260	13000		6600	ug/Kg	200	08/26/2013 19:28	73132
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	200	08/26/2013 19:28	73132
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	200	08/26/2013 19:28	73132

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

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08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-09
Lab ID: M1375-14
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/05/13 15:39

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		6700	ug/Kg	200	08/26/2013 20:22	73132
Aroclor-1221	ND		6700	ug/Kg	200	08/26/2013 20:22	73132
Aroclor-1232	ND		6700	ug/Kg	200	08/26/2013 20:22	73132
Aroclor-1242	ND		6700	ug/Kg	200	08/26/2013 20:22	73132
Aroclor-1248	ND		6700	ug/Kg	200	08/26/2013 20:22	73132
Aroclor-1254	ND		6700	ug/Kg	200	08/26/2013 20:22	73132
Aroclor-1260	13000		6700	ug/Kg	200	08/26/2013 20:22	73132
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	200	08/26/2013 20:22	73132
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	200	08/26/2013 20:22	73132

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

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08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-10
Lab ID: M1375-15
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/05/13 15:47

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		1700	ug/Kg	50	08/27/2013 18:27	73132
Aroclor-1221	ND		1700	ug/Kg	50	08/27/2013 18:27	73132
Aroclor-1232	ND		1700	ug/Kg	50	08/27/2013 18:27	73132
Aroclor-1242	ND		1700	ug/Kg	50	08/27/2013 18:27	73132
Aroclor-1248	ND		1700	ug/Kg	50	08/27/2013 18:27	73132
Aroclor-1254	ND		1700	ug/Kg	50	08/27/2013 18:27	73132
Aroclor-1260	1500	J	1700	ug/Kg	50	08/27/2013 18:27	73132
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	50	08/27/2013 18:27	73132
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	50	08/27/2013 18:27	73132

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-11
Lab ID: M1375-16
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/05/13 15:54

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		6800	ug/Kg	200	08/26/2013 21:35	73132
Aroclor-1221	ND		6800	ug/Kg	200	08/26/2013 21:35	73132
Aroclor-1232	ND		6800	ug/Kg	200	08/26/2013 21:35	73132
Aroclor-1242	ND		6800	ug/Kg	200	08/26/2013 21:35	73132
Aroclor-1248	ND		6800	ug/Kg	200	08/26/2013 21:35	73132
Aroclor-1254	ND		6800	ug/Kg	200	08/26/2013 21:35	73132
Aroclor-1260	16000		6800	ug/Kg	200	08/26/2013 21:35	73132
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	200	08/26/2013 21:35	73132
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	200	08/26/2013 21:35	73132

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client:	Tetra Tech, Inc.		
Client Sample ID:	SHHTR-CO-12	**Project:**	CTO-X039, Caulk, Concrete
Lab ID:	M1375-17	**Collection Date:**	08/05/13 16:00

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		34000	ug/Kg	1000	08/24/2013 1:09	73132
Aroclor-1221	ND		34000	ug/Kg	1000	08/24/2013 1:09	73132
Aroclor-1232	ND		34000	ug/Kg	1000	08/24/2013 1:09	73132
Aroclor-1242	ND		34000	ug/Kg	1000	08/24/2013 1:09	73132
Aroclor-1248	ND		34000	ug/Kg	1000	08/24/2013 1:09	73132
Aroclor-1254	ND		34000	ug/Kg	1000	08/24/2013 1:09	73132
Aroclor-1260	34000	J	34000	ug/Kg	1000	08/24/2013 1:09	73132
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	1000	08/24/2013 1:09	73132
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	1000	08/24/2013 1:09	73132

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quanititation limits

B - Analyte detected in the associated Method Blank

DF - Dilution Factor

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-13
Lab ID: M1375-18
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/05/13 16:05

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		33000	ug/Kg	1000	08/24/2013 2:03	73164
Aroclor-1221	ND		33000	ug/Kg	1000	08/24/2013 2:03	73164
Aroclor-1232	ND		33000	ug/Kg	1000	08/24/2013 2:03	73164
Aroclor-1242	ND		33000	ug/Kg	1000	08/24/2013 2:03	73164
Aroclor-1248	ND		33000	ug/Kg	1000	08/24/2013 2:03	73164
Aroclor-1254	ND		33000	ug/Kg	1000	08/24/2013 2:03	73164
Aroclor-1260	40000		33000	ug/Kg	1000	08/24/2013 2:03	73164
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	1000	08/24/2013 2:03	73164
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	1000	08/24/2013 2:03	73164

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-14
Lab ID: M1375-19
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/05/13 16:15

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		33000	ug/Kg	1000	08/24/2013 2:21	73164
Aroclor-1221	ND		33000	ug/Kg	1000	08/24/2013 2:21	73164
Aroclor-1232	ND		33000	ug/Kg	1000	08/24/2013 2:21	73164
Aroclor-1242	ND		33000	ug/Kg	1000	08/24/2013 2:21	73164
Aroclor-1248	ND		33000	ug/Kg	1000	08/24/2013 2:21	73164
Aroclor-1254	ND		33000	ug/Kg	1000	08/24/2013 2:21	73164
Aroclor-1260	39000		33000	ug/Kg	1000	08/24/2013 2:21	73164
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	1000	08/24/2013 2:21	73164
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	1000	08/24/2013 2:21	73164

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-15
Lab ID: M1375-20
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/05/13 16:19

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		6800	ug/Kg	200	08/26/2013 21:53	73164
Aroclor-1221	ND		6800	ug/Kg	200	08/26/2013 21:53	73164
Aroclor-1232	ND		6800	ug/Kg	200	08/26/2013 21:53	73164
Aroclor-1242	ND		6800	ug/Kg	200	08/26/2013 21:53	73164
Aroclor-1248	ND		6800	ug/Kg	200	08/26/2013 21:53	73164
Aroclor-1254	ND		6800	ug/Kg	200	08/26/2013 21:53	73164
Aroclor-1260	14000		6800	ug/Kg	200	08/26/2013 21:53	73164
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	200	08/26/2013 21:53	73164
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	200	08/26/2013 21:53	73164

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-16
Lab ID: M1375-21
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/05/13 16:25

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		33000	ug/Kg	1000	08/24/2013 4:28	73164
Aroclor-1221	ND		33000	ug/Kg	1000	08/24/2013 4:28	73164
Aroclor-1232	ND		33000	ug/Kg	1000	08/24/2013 4:28	73164
Aroclor-1242	ND		33000	ug/Kg	1000	08/24/2013 4:28	73164
Aroclor-1248	ND		33000	ug/Kg	1000	08/24/2013 4:28	73164
Aroclor-1254	ND		33000	ug/Kg	1000	08/24/2013 4:28	73164
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	1000	08/24/2013 4:28	73164
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	1000	08/24/2013 4:28	73164

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client:	Tetra Tech, Inc.			
Client Sample ID:	SHHTR-CO-17		**Project:**	CTO-X039, Caulk, Concrete
Lab ID:	M1375-22		**Collection Date:**	08/05/13 16:31

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		35000	ug/Kg	1000	08/24/2013 4:46	73164
Aroclor-1221	ND		35000	ug/Kg	1000	08/24/2013 4:46	73164
Aroclor-1232	ND		35000	ug/Kg	1000	08/24/2013 4:46	73164
Aroclor-1242	ND		35000	ug/Kg	1000	08/24/2013 4:46	73164
Aroclor-1248	ND		35000	ug/Kg	1000	08/24/2013 4:46	73164
Aroclor-1254	ND		35000	ug/Kg	1000	08/24/2013 4:46	73164
Aroclor-1260	37000		35000	ug/Kg	1000	08/24/2013 4:46	73164
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	1000	08/24/2013 4:46	73164
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	1000	08/24/2013 4:46	73164

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quanititation limits

B - Analyte detected in the associated Method Blank

DF - Dilution Factor

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-18
Lab ID: M1375-23

Project: CTO-X039, Caulk, Concrete
Collection Date: 08/05/13 16:36

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		33000	ug/Kg	1000	08/24/2013 5:04	73164
Aroclor-1221	ND		33000	ug/Kg	1000	08/24/2013 5:04	73164
Aroclor-1232	ND		33000	ug/Kg	1000	08/24/2013 5:04	73164
Aroclor-1242	ND		33000	ug/Kg	1000	08/24/2013 5:04	73164
Aroclor-1248	ND		33000	ug/Kg	1000	08/24/2013 5:04	73164
Aroclor-1254	ND		33000	ug/Kg	1000	08/24/2013 5:04	73164
Aroclor-1260	39000		33000	ug/Kg	1000	08/24/2013 5:04	73164
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	1000	08/24/2013 5:04	73164
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	1000	08/24/2013 5:04	73164

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-RB01
Lab ID: M1375-25
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/06/13 12:15

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_W**
Aroclor-1016	ND		1.0	ug/L	1	08/28/2013 13:13	73140
Aroclor-1221	ND		1.0	ug/L	1	08/28/2013 13:13	73140
Aroclor-1232	ND		1.0	ug/L	1	08/28/2013 13:13	73140
Aroclor-1242	ND		1.0	ug/L	1	08/28/2013 13:13	73140
Aroclor-1248	ND		1.0	ug/L	1	08/28/2013 13:13	73140
Aroclor-1254	ND		1.0	ug/L	1	08/28/2013 13:13	73140
Aroclor-1260	ND		1.0	ug/L	1	08/28/2013 13:13	73140
Surrogate: Tetrachloro-m-xylene	85.9		34-137	%REC	1	08/28/2013 13:13	73140
Surrogate: Decachlorobiphenyl	72.4		40-135	%REC	1	08/28/2013 13:13	73140

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-19
Lab ID: M1375-28
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/07/13 9:31

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		680000	ug/Kg	20000	08/26/2013 22:47	73164
Aroclor-1221	ND		680000	ug/Kg	20000	08/26/2013 22:47	73164
Aroclor-1232	ND		680000	ug/Kg	20000	08/26/2013 22:47	73164
Aroclor-1242	ND		680000	ug/Kg	20000	08/26/2013 22:47	73164
Aroclor-1248	ND		680000	ug/Kg	20000	08/26/2013 22:47	73164
Aroclor-1254	ND		680000	ug/Kg	20000	08/26/2013 22:47	73164
Aroclor-1260	3600000		680000	ug/Kg	20000	08/26/2013 22:47	73164
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	20000	08/26/2013 22:47	73164
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	20000	08/26/2013 22:47	73164

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-20
Lab ID: M1375-29
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/07/13 9:40

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		1700000	ug/Kg	50000	08/26/2013 23:05	73164
Aroclor-1221	ND		1700000	ug/Kg	50000	08/26/2013 23:05	73164
Aroclor-1232	ND		1700000	ug/Kg	50000	08/26/2013 23:05	73164
Aroclor-1242	ND		1700000	ug/Kg	50000	08/26/2013 23:05	73164
Aroclor-1248	ND		1700000	ug/Kg	50000	08/26/2013 23:05	73164
Aroclor-1254	ND		1700000	ug/Kg	50000	08/26/2013 23:05	73164
Aroclor-1260	11000000		1700000	ug/Kg	50000	08/26/2013 23:05	73164
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	50000	08/26/2013 23:05	73164
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	50000	08/26/2013 23:05	73164

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-21
Lab ID: M1375-30
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/07/13 9:52

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		680000	ug/Kg	20000	08/27/2013 0:36	73164
Aroclor-1221	ND		680000	ug/Kg	20000	08/27/2013 0:36	73164
Aroclor-1232	ND		680000	ug/Kg	20000	08/27/2013 0:36	73164
Aroclor-1242	ND		680000	ug/Kg	20000	08/27/2013 0:36	73164
Aroclor-1248	ND		680000	ug/Kg	20000	08/27/2013 0:36	73164
Aroclor-1254	ND		680000	ug/Kg	20000	08/27/2013 0:36	73164
Aroclor-1260	3100000		680000	ug/Kg	20000	08/27/2013 0:36	73164
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	20000	08/27/2013 0:36	73164
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	20000	08/27/2013 0:36	73164

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-22
Lab ID: M1375-31
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/07/13 10:00

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		1700000	ug/Kg	50000	08/27/2013 0:54	73164
Aroclor-1221	ND		1700000	ug/Kg	50000	08/27/2013 0:54	73164
Aroclor-1232	ND		1700000	ug/Kg	50000	08/27/2013 0:54	73164
Aroclor-1242	ND		1700000	ug/Kg	50000	08/27/2013 0:54	73164
Aroclor-1248	ND		1700000	ug/Kg	50000	08/27/2013 0:54	73164
Aroclor-1254	ND		1700000	ug/Kg	50000	08/27/2013 0:54	73164
Aroclor-1260	8700000		1700000	ug/Kg	50000	08/27/2013 0:54	73164
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	50000	08/27/2013 0:54	73164
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	50000	08/27/2013 0:54	73164

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Client:	Tetra Tech, Inc.		
Client Sample ID:	SHHTR-CO-23	**Project:**	CTO-X039, Caulk, Concrete
Lab ID:	M1375-32	**Collection Date:**	08/07/13 10:08

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		670000	ug/Kg	20000	08/27/2013 1:12	73164
Aroclor-1221	ND		670000	ug/Kg	20000	08/27/2013 1:12	73164
Aroclor-1232	ND		670000	ug/Kg	20000	08/27/2013 1:12	73164
Aroclor-1242	ND		670000	ug/Kg	20000	08/27/2013 1:12	73164
Aroclor-1248	ND		670000	ug/Kg	20000	08/27/2013 1:12	73164
Aroclor-1254	ND		670000	ug/Kg	20000	08/27/2013 1:12	73164
Aroclor-1260	2500000		670000	ug/Kg	20000	08/27/2013 1:12	73164
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	20000	08/27/2013 1:12	73164
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	20000	08/27/2013 1:12	73164

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-24
Lab ID: M1375-33
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/07/13 10:15

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		1700000	ug/Kg	50000	08/27/2013 1:30	73164
Aroclor-1221	ND		1700000	ug/Kg	50000	08/27/2013 1:30	73164
Aroclor-1232	ND		1700000	ug/Kg	50000	08/27/2013 1:30	73164
Aroclor-1242	ND		1700000	ug/Kg	50000	08/27/2013 1:30	73164
Aroclor-1248	ND		1700000	ug/Kg	50000	08/27/2013 1:30	73164
Aroclor-1254	ND		1700000	ug/Kg	50000	08/27/2013 1:30	73164
Aroclor-1260	6700000		1700000	ug/Kg	50000	08/27/2013 1:30	73164
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	50000	08/27/2013 1:30	73164
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	50000	08/27/2013 1:30	73164

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-DUP03 **Project:** CTO-X039, Caulk, Concrete
Lab ID: M1375-34 **Collection Date:** 08/07/13 0:00

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		1000000	ug/Kg	30000	08/27/2013 1:48	73164
Aroclor-1221	ND		1000000	ug/Kg	30000	08/27/2013 1:48	73164
Aroclor-1232	ND		1000000	ug/Kg	30000	08/27/2013 1:48	73164
Aroclor-1242	ND		1000000	ug/Kg	30000	08/27/2013 1:48	73164
Aroclor-1248	ND		1000000	ug/Kg	30000	08/27/2013 1:48	73164
Aroclor-1254	ND		1000000	ug/Kg	30000	08/27/2013 1:48	73164
Aroclor-1260	3800000		1000000	ug/Kg	30000	08/27/2013 1:48	73164
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	30000	08/27/2013 1:48	73164
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	30000	08/27/2013 1:48	73164

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-DUP02
Lab ID: M1375-35
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/07/13 0:00

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		670000	ug/Kg	20000	08/27/2013 2:07	73164
Aroclor-1221	ND		670000	ug/Kg	20000	08/27/2013 2:07	73164
Aroclor-1232	ND		670000	ug/Kg	20000	08/27/2013 2:07	73164
Aroclor-1242	ND		670000	ug/Kg	20000	08/27/2013 2:07	73164
Aroclor-1248	ND		670000	ug/Kg	20000	08/27/2013 2:07	73164
Aroclor-1254	ND		670000	ug/Kg	20000	08/27/2013 2:07	73164
Aroclor-1260	2400000		670000	ug/Kg	20000	08/27/2013 2:07	73164
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	20000	08/27/2013 2:07	73164
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	20000	08/27/2013 2:07	73164

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-25
Lab ID: M1375-36
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/07/13 10:25

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		33000	ug/Kg	1000	08/24/2013 10:28	73164
Aroclor-1221	ND		33000	ug/Kg	1000	08/24/2013 10:28	73164
Aroclor-1232	ND		33000	ug/Kg	1000	08/24/2013 10:28	73164
Aroclor-1242	ND		33000	ug/Kg	1000	08/24/2013 10:28	73164
Aroclor-1248	ND		33000	ug/Kg	1000	08/24/2013 10:28	73164
Aroclor-1254	ND		33000	ug/Kg	1000	08/24/2013 10:28	73164
Aroclor-1260	120000		33000	ug/Kg	1000	08/24/2013 10:28	73164
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	1000	08/24/2013 10:28	73164
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	1000	08/24/2013 10:28	73164

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-26 **Project:** CTO-X039, Caulk, Concrete
Lab ID: M1375-37 **Collection Date:** 08/07/13 10:33

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		6600	ug/Kg	200	08/27/2013 2:25	73164
Aroclor-1221	ND		6600	ug/Kg	200	08/27/2013 2:25	73164
Aroclor-1232	ND		6600	ug/Kg	200	08/27/2013 2:25	73164
Aroclor-1242	ND		6600	ug/Kg	200	08/27/2013 2:25	73164
Aroclor-1248	ND		6600	ug/Kg	200	08/27/2013 2:25	73164
Aroclor-1254	ND		6600	ug/Kg	200	08/27/2013 2:25	73164
Aroclor-1260	9400		6600	ug/Kg	200	08/27/2013 2:25	73164
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	200	08/27/2013 2:25	73164
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	200	08/27/2013 2:25	73164

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-27
Lab ID: M1375-38
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/07/13 10:40

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		6600	ug/Kg	200	08/27/2013 2:43	73164
Aroclor-1221	ND		6600	ug/Kg	200	08/27/2013 2:43	73164
Aroclor-1232	ND		6600	ug/Kg	200	08/27/2013 2:43	73164
Aroclor-1242	ND		6600	ug/Kg	200	08/27/2013 2:43	73164
Aroclor-1248	ND		6600	ug/Kg	200	08/27/2013 2:43	73164
Aroclor-1254	ND		6600	ug/Kg	200	08/27/2013 2:43	73164
Aroclor-1260	12000		6600	ug/Kg	200	08/27/2013 2:43	73164
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	200	08/27/2013 2:43	73164
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	200	08/27/2013 2:43	73164

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-28
Lab ID: M1375-39
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/07/13 10:47

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		6700	ug/Kg	200	08/27/2013 3:37	73164
Aroclor-1221	ND		6700	ug/Kg	200	08/27/2013 3:37	73164
Aroclor-1232	ND		6700	ug/Kg	200	08/27/2013 3:37	73164
Aroclor-1242	ND		6700	ug/Kg	200	08/27/2013 3:37	73164
Aroclor-1248	ND		6700	ug/Kg	200	08/27/2013 3:37	73164
Aroclor-1254	ND		6700	ug/Kg	200	08/27/2013 3:37	73164
Aroclor-1260	13000		6700	ug/Kg	200	08/27/2013 3:37	73164
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	200	08/27/2013 3:37	73164
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	200	08/27/2013 3:37	73164

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-29
Lab ID: M1375-40
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/07/13 10:53

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		34000	ug/Kg	1000	08/24/2013 14:05	73187
Aroclor-1221	ND		34000	ug/Kg	1000	08/24/2013 14:05	73187
Aroclor-1232	ND		34000	ug/Kg	1000	08/24/2013 14:05	73187
Aroclor-1242	ND		34000	ug/Kg	1000	08/24/2013 14:05	73187
Aroclor-1248	ND		34000	ug/Kg	1000	08/24/2013 14:05	73187
Aroclor-1254	ND		34000	ug/Kg	1000	08/24/2013 14:05	73187
Aroclor-1260	44000		34000	ug/Kg	1000	08/24/2013 14:05	73187
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	1000	08/24/2013 14:05	73187
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	1000	08/24/2013 14:05	73187

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-30
Lab ID: M1375-41
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/07/13 11:00

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		34000	ug/Kg	1000	08/24/2013 14:23	73187
Aroclor-1221	ND		34000	ug/Kg	1000	08/24/2013 14:23	73187
Aroclor-1232	ND		34000	ug/Kg	1000	08/24/2013 14:23	73187
Aroclor-1242	ND		34000	ug/Kg	1000	08/24/2013 14:23	73187
Aroclor-1248	ND		34000	ug/Kg	1000	08/24/2013 14:23	73187
Aroclor-1254	ND		34000	ug/Kg	1000	08/24/2013 14:23	73187
Aroclor-1260	55000		34000	ug/Kg	1000	08/24/2013 14:23	73187
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	1000	08/24/2013 14:23	73187
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	1000	08/24/2013 14:23	73187

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-31
Lab ID: M1375-42
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/07/13 11:07

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		7000	ug/Kg	200	08/27/2013 3:55	73187
Aroclor-1221	ND		7000	ug/Kg	200	08/27/2013 3:55	73187
Aroclor-1232	ND		7000	ug/Kg	200	08/27/2013 3:55	73187
Aroclor-1242	ND		7000	ug/Kg	200	08/27/2013 3:55	73187
Aroclor-1248	ND		7000	ug/Kg	200	08/27/2013 3:55	73187
Aroclor-1254	ND		7000	ug/Kg	200	08/27/2013 3:55	73187
Aroclor-1260	15000		7000	ug/Kg	200	08/27/2013 3:55	73187
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	200	08/27/2013 3:55	73187
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	200	08/27/2013 3:55	73187

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-32
Lab ID: M1375-43
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/07/13 11:16

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		6500	ug/Kg	200	08/27/2013 4:13	73187
Aroclor-1221	ND		6500	ug/Kg	200	08/27/2013 4:13	73187
Aroclor-1232	ND		6500	ug/Kg	200	08/27/2013 4:13	73187
Aroclor-1242	ND		6500	ug/Kg	200	08/27/2013 4:13	73187
Aroclor-1248	ND		6500	ug/Kg	200	08/27/2013 4:13	73187
Aroclor-1254	ND		6500	ug/Kg	200	08/27/2013 4:13	73187
Aroclor-1260	20000		6500	ug/Kg	200	08/27/2013 4:13	73187
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	200	08/27/2013 4:13	73187
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	200	08/27/2013 4:13	73187

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-33
Lab ID: M1375-44
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/07/13 11:23

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		34000	ug/Kg	1000	08/24/2013 15:17	73187
Aroclor-1221	ND		34000	ug/Kg	1000	08/24/2013 15:17	73187
Aroclor-1232	ND		34000	ug/Kg	1000	08/24/2013 15:17	73187
Aroclor-1242	ND		34000	ug/Kg	1000	08/24/2013 15:17	73187
Aroclor-1248	ND		34000	ug/Kg	1000	08/24/2013 15:17	73187
Aroclor-1254	ND		34000	ug/Kg	1000	08/24/2013 15:17	73187
Aroclor-1260	44000		34000	ug/Kg	1000	08/24/2013 15:17	73187
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	1000	08/24/2013 15:17	73187
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	1000	08/24/2013 15:17	73187

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-DUP04
Lab ID: M1375-45
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/07/13 0:00

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		6700	ug/Kg	200	08/27/2013 4:32	73187
Aroclor-1221	ND		6700	ug/Kg	200	08/27/2013 4:32	73187
Aroclor-1232	ND		6700	ug/Kg	200	08/27/2013 4:32	73187
Aroclor-1242	ND		6700	ug/Kg	200	08/27/2013 4:32	73187
Aroclor-1248	ND		6700	ug/Kg	200	08/27/2013 4:32	73187
Aroclor-1254	ND		6700	ug/Kg	200	08/27/2013 4:32	73187
Aroclor-1260	20000		6700	ug/Kg	200	08/27/2013 4:32	73187
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	200	08/27/2013 4:32	73187
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	200	08/27/2013 4:32	73187

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-34
Lab ID: M1375-46
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/07/13 11:30

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		33000	ug/Kg	1000	08/24/2013 15:53	73187
Aroclor-1221	ND		33000	ug/Kg	1000	08/24/2013 15:53	73187
Aroclor-1232	ND		33000	ug/Kg	1000	08/24/2013 15:53	73187
Aroclor-1242	ND		33000	ug/Kg	1000	08/24/2013 15:53	73187
Aroclor-1248	ND		33000	ug/Kg	1000	08/24/2013 15:53	73187
Aroclor-1254	ND		33000	ug/Kg	1000	08/24/2013 15:53	73187
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	1000	08/24/2013 15:53	73187
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	1000	08/24/2013 15:53	73187

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-35
Lab ID: M1375-47

Project: CTO-X039, Caulk, Concrete
Collection Date: 08/07/13 11:37

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		3400	ug/Kg	100	08/27/2013 14:13	73187
Aroclor-1221	ND		3400	ug/Kg	100	08/27/2013 14:13	73187
Aroclor-1232	ND		3400	ug/Kg	100	08/27/2013 14:13	73187
Aroclor-1242	ND		3400	ug/Kg	100	08/27/2013 14:13	73187
Aroclor-1248	ND		3400	ug/Kg	100	08/27/2013 14:13	73187
Aroclor-1254	ND		3400	ug/Kg	100	08/27/2013 14:13	73187
Aroclor-1260	19000		3400	ug/Kg	100	08/27/2013 14:13	73187
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	100	08/27/2013 14:13	73187
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	100	08/27/2013 14:13	73187

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CO-36
Lab ID: M1375-48
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/07/13 11:43

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		6700	ug/Kg	200	08/27/2013 5:08	73187
Aroclor-1221	ND		6700	ug/Kg	200	08/27/2013 5:08	73187
Aroclor-1232	ND		6700	ug/Kg	200	08/27/2013 5:08	73187
Aroclor-1242	ND		6700	ug/Kg	200	08/27/2013 5:08	73187
Aroclor-1248	ND		6700	ug/Kg	200	08/27/2013 5:08	73187
Aroclor-1254	ND		6700	ug/Kg	200	08/27/2013 5:08	73187
Aroclor-1260	13000		6700	ug/Kg	200	08/27/2013 5:08	73187
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	200	08/27/2013 5:08	73187
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	200	08/27/2013 5:08	73187

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-SD-01
Lab ID: M1375-26
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/05/13 14:08

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		1900000	ug/Kg	50000	08/26/2013 22:11	73164
Aroclor-1221	ND		1900000	ug/Kg	50000	08/26/2013 22:11	73164
Aroclor-1232	ND		1900000	ug/Kg	50000	08/26/2013 22:11	73164
Aroclor-1242	ND		1900000	ug/Kg	50000	08/26/2013 22:11	73164
Aroclor-1248	ND		1900000	ug/Kg	50000	08/26/2013 22:11	73164
Aroclor-1254	ND		1900000	ug/Kg	50000	08/26/2013 22:11	73164
Aroclor-1260	8700000		1900000	ug/Kg	50000	08/26/2013 22:11	73164
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	50000	08/26/2013 22:11	73164
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	50000	08/26/2013 22:11	73164

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-SD-02
Lab ID: M1375-27
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/05/13 14:15

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		5800000	ug/Kg	100000	08/26/2013 22:29	73164
Aroclor-1221	ND		5800000	ug/Kg	100000	08/26/2013 22:29	73164
Aroclor-1232	ND		5800000	ug/Kg	100000	08/26/2013 22:29	73164
Aroclor-1242	ND		5800000	ug/Kg	100000	08/26/2013 22:29	73164
Aroclor-1248	ND		5800000	ug/Kg	100000	08/26/2013 22:29	73164
Aroclor-1254	ND		5800000	ug/Kg	100000	08/26/2013 22:29	73164
Aroclor-1260	41000000		5800000	ug/Kg	100000	08/26/2013 22:29	73164
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	100000	08/26/2013 22:29	73164
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	100000	08/26/2013 22:29	73164

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CA-01
Lab ID: M1375-01
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/05/13 13:35

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		36000	ug/Kg	1000	08/23/2013 17:38	73132
Aroclor-1221	ND		36000	ug/Kg	1000	08/23/2013 17:38	73132
Aroclor-1232	ND		36000	ug/Kg	1000	08/23/2013 17:38	73132
Aroclor-1242	ND		36000	ug/Kg	1000	08/23/2013 17:38	73132
Aroclor-1248	ND		36000	ug/Kg	1000	08/23/2013 17:38	73132
Aroclor-1254	ND		36000	ug/Kg	1000	08/23/2013 17:38	73132
Aroclor-1260	320000		36000	ug/Kg	1000	08/23/2013 17:38	73132
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	1000	08/23/2013 17:38	73132
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	1000	08/23/2013 17:38	73132

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CA-02
Lab ID: M1375-02
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/05/13 13:46

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		37000	ug/Kg	1000	08/23/2013 18:32	73132
Aroclor-1221	ND		37000	ug/Kg	1000	08/23/2013 18:32	73132
Aroclor-1232	ND		37000	ug/Kg	1000	08/23/2013 18:32	73132
Aroclor-1242	ND		37000	ug/Kg	1000	08/23/2013 18:32	73132
Aroclor-1248	ND		37000	ug/Kg	1000	08/23/2013 18:32	73132
Aroclor-1254	ND		37000	ug/Kg	1000	08/23/2013 18:32	73132
Aroclor-1260	320000		37000	ug/Kg	1000	08/23/2013 18:32	73132
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	1000	08/23/2013 18:32	73132
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	1000	08/23/2013 18:32	73132

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CA-03
Lab ID: M1375-03
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/05/13 13:52

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		1100000	ug/Kg	10000	08/26/2013 17:21	73132
Aroclor-1221	ND		1100000	ug/Kg	10000	08/26/2013 17:21	73132
Aroclor-1232	ND		1100000	ug/Kg	10000	08/26/2013 17:21	73132
Aroclor-1242	ND		1100000	ug/Kg	10000	08/26/2013 17:21	73132
Aroclor-1248	ND		1100000	ug/Kg	10000	08/26/2013 17:21	73132
Aroclor-1254	ND		1100000	ug/Kg	10000	08/26/2013 17:21	73132
Aroclor-1260	3500000		1100000	ug/Kg	10000	08/26/2013 17:21	73132
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	10000	08/26/2013 17:21	73132
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	10000	08/26/2013 17:21	73132

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CA-04 **Project:** CTO-X039, Caulk, Concrete
Lab ID: M1375-04 **Collection Date:** 08/05/13 13:58

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_S**
Aroclor-1016	ND		820000	ug/Kg	20000	08/26/2013 17:39	73132
Aroclor-1221	ND		820000	ug/Kg	20000	08/26/2013 17:39	73132
Aroclor-1232	ND		820000	ug/Kg	20000	08/26/2013 17:39	73132
Aroclor-1242	ND		820000	ug/Kg	20000	08/26/2013 17:39	73132
Aroclor-1248	ND		820000	ug/Kg	20000	08/26/2013 17:39	73132
Aroclor-1254	ND		820000	ug/Kg	20000	08/26/2013 17:39	73132
Aroclor-1260	3500000		820000	ug/Kg	20000	08/26/2013 17:39	73132
Surrogate: Tetrachloro-m-xylene	0	S	34-147	%REC	20000	08/26/2013 17:39	73132
Surrogate: Decachlorobiphenyl	0	S	60-125	%REC	20000	08/26/2013 17:39	73132

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

08/29/2013

Client: Tetra Tech, Inc.
Client Sample ID: SHHTR-CA-RB01
Lab ID: M1375-24
Project: CTO-X039, Caulk, Concrete
Collection Date: 08/06/13 12:05

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
SW846 8082A -- PCB by GC-ECD							**SW8082_W**
Aroclor-1016	ND		1.0	ug/L	1	08/28/2013 12:38	73140
Aroclor-1221	ND		1.0	ug/L	1	08/28/2013 12:38	73140
Aroclor-1232	ND		1.0	ug/L	1	08/28/2013 12:38	73140
Aroclor-1242	ND		1.0	ug/L	1	08/28/2013 12:38	73140
Aroclor-1248	ND		1.0	ug/L	1	08/28/2013 12:38	73140
Aroclor-1254	ND		1.0	ug/L	1	08/28/2013 12:38	73140
Aroclor-1260	ND		1.0	ug/L	1	08/28/2013 12:38	73140
Surrogate: Tetrachloro-m-xylene	87.3		34-137	%REC	1	08/28/2013 12:38	73140
Surrogate: Decachlorobiphenyl	66.3		40-135	%REC	1	08/28/2013 12:38	73140

Qualifiers:
ND - Not Detected at the Reporting Limit
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DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
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